DOCTOR OF PHILOSOPHY

The way-finding journey within a large public building: a user centred study of the holistic way-finding experience across a range of visual ability

McIntyre, Lesley

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Lesley McIntyre

2011

University of Dundee

The Way-finding Journey within a Large Public Building:

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Lesley Jayne McIntyre

Thesis submitted for the degree of Doctor of Philosophy

University of Dundee

2011

To Sharon and Derek McIntyre

My Parents

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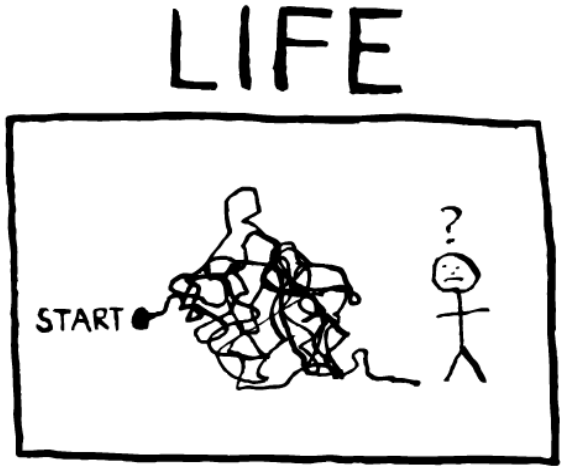

Figure 0.1: Edward Monkton's musing of 'Life'

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Acknowledgements

My experience of this PhD is best depicted by Edward Monkton's musing of 'Life' [figure 0.1]. In the beginning I had an idea – this was the start of my research journey. The idea became very tangled and took me in several different directions before I, with a massive amount of support from everyone around me, managed to get it under control and focused.

It has been an exciting journey, frustrating in parts, and when I got to the end I answered my research questions but found that I had a lot more questions that I wanted to pursue. I would like to thank every single person who has listened to, helped and inspired me throughout this research.

First and foremost I am indebted to my participants and while I cannot use their real names will just thank: Alfie, Katie & Bruno, James, Evie, Lily, Adam, Emma, Jack, Grace and Ben. Thank you for telling me your way-finding stories.

I offer my sincerest gratitude to my supervisors. Special thanks, in equal measures, must go to Jeanette Paul and Professor Jennifer Harris for their foresight, knowledge and kindness. For helping me find my way through this research and for offering advice at exactly the correct time. You encouraged me to find my writing voice and I have really enjoyed our conversations. This PhD would not have been possible without you!

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I would like to thank Graeme Hutton, Dean of Dundee School of Architecture, for providing the opportunity to gain teaching, critiquing and presentation experience. Thank you for

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Thanks to the Arts and Humanities Research Council for funding two years of this PhD.

Personal Acknowledgements

Thanks to all my friends for listening to ‘PhD chat’ over the phone and for understanding when I missed birthdays and get-togethers.

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Last, but never least, special thanks must go to all of my family. To Derek and Sharon McIntyre for always believing that I could do it, for listening, for being my inspiration and providing me with motivation, treats and holidays. Special thanks to mum who has read every single page.

To Mark and Marta for sending me Asia’s artwork and vital PhD related Christmas presents. To Asia, who in the time I have been doing this research has been born, giggled, learned to high five, blow kisses, crawl, walk and wrap us all around her little finger. She has achieved much more than I have with her time.

Thank-you to my grandparents for the encouraging chats over the phone. You will be so glad to know that this is the final year of me being a student... it has been a very long time!!

Thanks to Carole, Bruce and Andrew Kennedy for offering comforting words of support and cheering up a day of writing with coffee and cake.

Finally, thanks to Sean Kennedy for all of those chocolate treats, for making dinner when it was definitely my turn and for always cheering me up when stages of the PhD were overwhelming.

Declaration

This thesis is the work of Lesley Jayne McIntyre and the author is solely responsible for the content. All references cited have been consulted directly by the author unless otherwise stated. The content of this thesis has not previously been submitted for a higher degree.

Lesley Jayne McIntyre

BSc. BA [Honours] M.Arch [Distinction]

Autobiographical Preface

Originally from Portstewart, a small coastal town in Northern Ireland, I moved to Dundee in 2001 to study Architecture at the University of Dundee. Who could have known then that ten years later I would be still here writing my Ph.D.?

Through my architectural education I have developed skills in translating client briefs and user needs into the design of space and program. I have also acquired an understanding of a range of architectural approaches in different design scenarios. Taking my theoretical understanding into the real world, I have acquired experience in professional architectural practice in New York and Northern Ireland as well as in Edinburgh and Dundee. This training has enabled me to gain valuable experience and skills that continue to develop as I mature as researcher and designer within the field of Architecture and Design.

When working in Northern Ireland for W & M Given Architects I was extremely lucky to work as part of a team designing a special needs school. This was where the research seed was sown. I became extremely interested in user-centred design with particular regard to disability.

When returning to University, to study for my BA degree, I was able to use my newly acquired knowledge and research passion to undertake a design project when I worked with user groups from Sense Scotland. For my Masters degree I became involved in designing a live project for an arts and cultural centre for the 2012 London Olympics which investigated how complex spaces could be designed to be easily navigable.

A combination of my past work experience and this project really let me find my enthusiasm for architecture and I feel that knowledge and experience brought from this training has informed and developed in work throughout my academic portfolio.

An ability to use a variety of mediums such as drawing, model making and sketching ideas and concepts, together with developing technical computer skills, has greatly assisted in allowing me to communicate my ideas. I have gathered many key skills working within the studio environment and have absorbed a great deal of knowledge by working with a range of people. I believe that my creative and problem solving skills have become my greatest assets.

My curiosity has been immersed in the field of visual loss and the architecture of way-finding. I have always been interested in how people find their way through buildings, partly because I always seem to get lost.

Finding my way through this research has been extremely challenging. It has been frustrating and exciting all at the same time. I feel that, with the support from my supervisors Jeanette Paul and Professor Jennifer Harris, I have matured both as a researcher and designer.

Through design of an innovative method and use of methodology, my research explores the *Way-finding Hot-spots* experienced by people who have a range of visual ability as they way-find around public buildings. This thesis presents this narrative and this research has been widely published and presented within conferences, articles and educational seminars and workshops (McIntyre, 2009;McIntyre, 2010c;McIntyre, 2010b;McIntyre, 2010a;McIntyre, 2011b;McIntyre, 2011a;McIntyre et al., 2010a;McIntyre et al., 2009;McIntyre et al., 2010c;McIntyre et al., 2010d;McIntyre et al., 2010b;McIntyre et al., 2011).

Research Abstract

Context of the Research

This PhD Thesis has been immersed in investigating the holistic experience of way-finding in buildings by people who have a range of visual ability.

Previous research studies, spanning across a broad spectrum of disciplines, have focused on various characteristics of human way-finding (Arthur and Passini, 1992;Lynch, 1960;Downs and Stea, 1973). It is specifically recognised that the built environment is failing people with visual loss (Barker et al., 1995) and the strategic task and skill of way-finding within a building is a particular problem (Arthur and Passini, 1992). Under the social model of disability (Oliver, 1990) this is recognised as a form of architectural disablement (Goldsmith, 1997).

The Gap in Current Knowledge

There are few evidence-based studies of way-finding in a building. Furthermore, there are no studies of real-life experiences of way-finding undertaken by real-life participants who have a range of visual ability within the context of a real-life building. This leads to a research question: *What are the design issues revealed by participants who have a range of visual ability as they way-find in a large public building?*

Addressing the Gap

This doctoral research, based within the discipline of architecture, focuses on the holistic experiential components of a Journey (Myerson, 2001;Harper and Green, 2000). It coins and defines the term ***Way-finding Hot-spot*** as it explores the events [positive and negative] which are experienced and therefore impact on a Way-finding Journey around a building.

Methodology and Research Methods

To fill an important gap in the current knowledge a research enquiry, based on a user-centred design approach, was implemented. Exploratory in nature, the methodology was inductive and it evolved throughout the study. A series of Research Principles, borrowed

from the established methodologies of Grounded Theory (Glaser, 1968) and Case Study (Yin, 2003a;Yin, 2003b), guided this study.

Ten participants [with varying degrees of visual ability, different ages and other forms of disability] undertook a ***Way-finding Scenario*** designed to evaluate both existing memories of way-finding and present way-finding experience. This was composed of a Purposeful Conversation (Burgess, 1982) and a context specific Way-finding Task.

Research Outcome

The study has produced a large amount of data based on user experience in a real-world way-finding context – this has not been done before. Participant data contributed to a new Theory of Way-finding – ***The Experiential Charting of a Way-finding Journey*** – which derived from experiential data, was found to be composed of three elements: Journey Stages, Tasks Components and Communication Requirements.

Research Relevance

This thesis presents detailed findings which generate dialogue in the design of way-finding systems suitable for a diverse range of way-finders. It provides a research-based foundation to open the problem area and provide an insight into the issues people with different visual abilities encounter as they undertake a Way-finding Journey around a building. It generates a greater understanding of the problems and joys of way-finding in a building which will be of use in professional practice across disciplines of architecture and design as well as in areas of rehabilitation, policy-making and academia.

Future Research

This research is a start, but it is not the end. Future research questions have been revealed and these, combined with further reviews of literature and creative use of method, will further explore the phenomenon of way-finding within the context of buildings.

Summary List of Contents

This thesis documents the narrative of how the Researcher has found her way through a study which investigates the title: *The Way-finding Journey within a Large Public Building: A user centred study of the holistic way-finding experience across a range of visual ability.*

In **Chapter 1** - *Introduction* - the PhD research is established and the themes, context of the study, research position, line of enquiry, rationale and objectives are introduced before a full chapter outline is illustrated. In **Chapter 2** - *The Research Context* - the interdisciplinary literature context in relation to the Research Themes is surveyed through four main Reviews. Review 1 is an all encompassing 'scoping' of literature. Review 2 portrays the nature of visual loss. Review 3 depicts the nature of way-finding and Review 4 provides an overview of current design approaches used to assist/enhance way-finding.

In **Chapter 3 -** *Methodology and Methods* - the research questions are stated and the design of the research is established. In **Chapter 4** - *Discussion, Analysis & Findings* – the experiential data generated by the study is presented, analysed and discussed.

In **Chapter 5** - *Findings Conclusion* - the fundamental themes of the research are extracted from the participant data and are discussed in relation to the context of *The Research Context.* Finally, in **Chapter 6** - *Post-Conclusion & Reflection* - the PhD journey is concluded with critical reflection and evaluation.

In the **Appendix** files – *A, B, C, D, E, F, and G* – fundamental elements of the research process [including ethical and data protocol] are fully documented.

Readers Notes

Note 1: Terminology in relation to Visual Loss. Aware that visual loss terminology often has associated presumptions (Mogk and Mogk, 2004;Kaye and Royal National Institute for the Blind, 2009) the Researcher uses the term *visual loss* when referring to a reduction in visual ability.

Note 2: Terminology definition in relation 'Way-finding Hot-spot'. The term *Way-finding Hot-spot[s]* is used in regard to any encounter or event, temporal or spatial, positive or negative, which was experienced by the Participants when way-finding. They are specific happenings which invoked a physical or emotional response from the way-finder either in their past memories or their present experiences of way-finding. Please note that the full definition of a *Way-finding Hot-spot* can be found within Chapter 3.

Note 3: Participant Narrative Illustrations. Illustrations were found to be extremely helpful throughout the research process to understand, present and disseminate findings to a range of disciplines. These illustrations are used within Chapter 4 *Discussion, Analysis and Findings*, to visually portray participants' narrative of their way-finding experiences.

Note 4: Post-Viva Reflection Footnotes. There are instances within this thesis when a 'post-viva reflection note' is used to clarify, describe, or demonstrate a discussion point which arose within the Viva Voice Examination.

Note 5: Intended Audience and Accessible Language. From the outset this study crossed many disciplines and this was intensified by the fact that although the Researcher has an Architectural background, the Supervisors are from Architecture, Design and Social Sciences.

It quickly became clear that the terminology, themes and findings of this research are of interest to different disciplines therefore there is not one intended audience. As such the Researcher has strived to make this study [and language used] as accessible as possible.

Note 6: **Accessible Format.** The Researcher was always aware of making this research accessible to people who have a range of visual ability therefore different format/reading requirements. To enable the reader to access this thesis in a format suitable to their needs [e.g. Braille, large print or by using read aloud software] the full content of this thesis can be found in digital PDF format on the accompanying CD.

Note 7: The Thesis and Prominent Research Elements. This thesis is a way-finding journey in its own right and therefore the researcher wishes to clarify and emphasise elements of the research which should take prominence in terms of the intended audience.

Reader's interests and location of research elements within the thesis:

- a review and critique of the literature context – Chapter 2
- research questions and summary of the gap in knowledge – end of Chapter 2 and beginning of Chapter 3
- development of Methodology – Chapter 3
- development of the Research Method – the Way-finding Scenario – Chapter 3 and Appendix A
- Participant Profiles - full Profiles in Appendix B and summarised Profiles in the beginning of Chapter 4
- Participants experiential way-finding data and narrative illustrations - Chapter 4 and Appendix C
- full conclusions of the Participant data – Chapter 5
- Researchers' reflection on the process and future research topics – Chapter 6

Chapter 1 Introduction

‘“Begin at the beginning,”

the King said gravely,

“and go on till you come to the end: then stop.”’

(Carroll and Tenniel, 1992,p. 143)

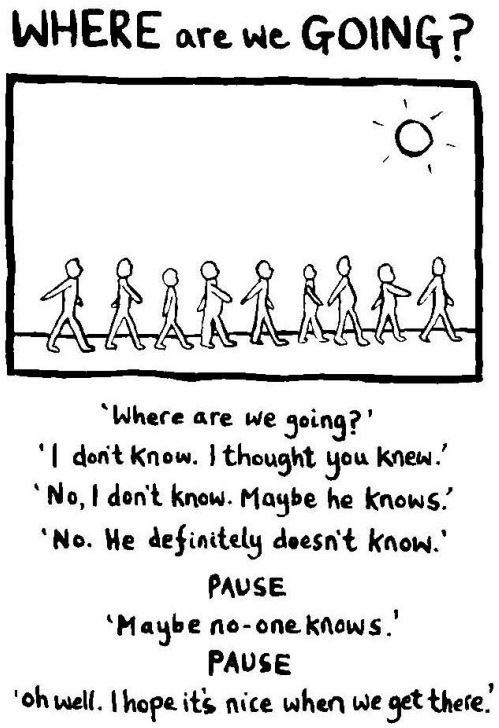

Figure 1.1: 'Where are we Going?'

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1.0 Chapter Introduction

We all undertake the daily task of ***Way-finding*** in a public building. It is how we arrive at the correct platform before our train departs from the station, or how we meander through a busy shopping centre on a Saturday morning. It is how we get to a meeting in an office we have never been to before, or is the exploring of an art gallery or museum [figure 1.1]. It is the cognitive, behavioural and strategic task of planning movement through space (Arthur and Passini, 1992). It ***is how we get from A to B.***

Way-finding in a building is not always a conscious process however we are suddenly made very aware of it if we become lost or disorientated. This is when a form of way-finding communication is needed and when a way-finding plan to reach the destination is required.

However: *What if you were not able to use current forms of way-finding communications [signage etc.] because you couldn't see what they say? What if they weren't giving you the information you needed to make your way through your surroundings?*

Would you be able to identify and navigate onto the site of your desired building? Would you be able to find your way to the entrance? Would this be an enjoyable experience free from hazards? Would you be able to find and open the front door?

Would you be able to determine that you had entered the correct building? How would you begin to find your way to your destination? Would you feel you had the opportunity to explore your surroundings?

What if you couldn't understand the directions a member of staff was giving you? How would you interpret a 'volumous' [sic] *space or judge the distance to reach the end of a corridor? Would you be able to find the toilets and know what to do in an emergency?*

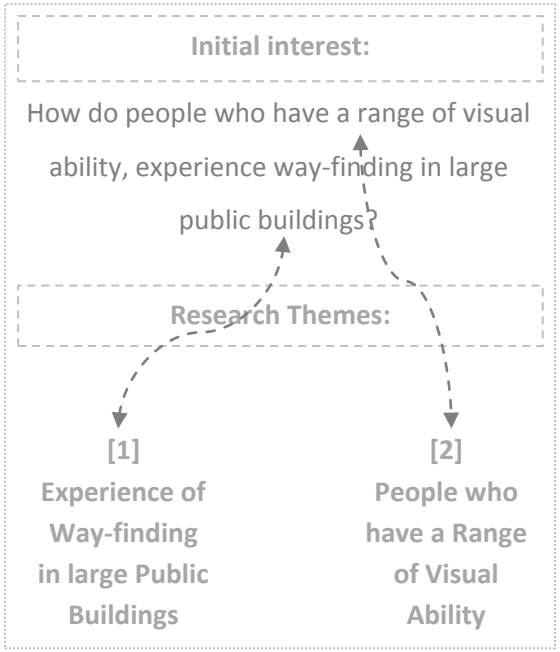

Figure 1.2: Emergence of Research Themes

This research project began with an initial interest in finding out how people who have a range of visual ability experience way-finding in large public buildings. Two major *Research Themes* [figure 1.2] emerged from this interest. These Research Themes, explored over a broad and vast literature review, became focused and a gap in the current knowledge was recognised. From this gap, research questions were formulated and a methodology and set of methods were designed to take the research forward to answer the questions.

Through working with Participants who have a range of visual loss, experiential narrative relating to the positive and negative experiences of way-finding within public buildings were collected, analysed, coded and presented. A new theory – *The Experiential Charting of a Way-finding Journey* – emerged.

As well as celebrating the outcome and successes of the study, limitations were also reflected upon. The significance, relevance and implications across multi-disciplinary fields of education, practice and research were considered and recommendations for further research made.

This Chapter introduces the Thesis. In Section 1.0 the context of the research and importance of the research is established. In Section 1.1 the motivation, scope and gap in the knowledge is outlined while in Section 1.2 the research position and objectives are demonstrated. In Section 1.3 the structure and rationale of the thesis is illustrated.

1.1 Motivation, Scope and Gap in the Current Knowledge

'All architecture functions as a potential stimulus for movement, real or imagined. A building is an incitement to action, a stage for movement and interaction.'

(Bloomer et al., 1977,p. 59).

Way-finding Journeys are emotional and physical roller-coasters full of excitement, anxiety, fear, joy, frustration, uncertainty and achievement. They impact on the way-finder's physical safety, independence and emotional well-being. The holistic experience [the positives and the negatives] of a Way-finding Journey influences the trip around the building and impacts on the probability of future visits.

The task of way-finding within a public building is raised as a particular problem by people with different degrees of visual loss. Described as an 'assault course', *the building* 'poses the most serious threat to independence and full social integration' (Barker et al., 1995,p. 10).

The importance of understanding way-finding, both in terms of process and design, is not doubted in literature. Spanning across a broad spectrum of disciplines, previous research studies have focused on various characteristics of human way-finding. It has been investigated across disciplines ranging through urban design, geography, virtual environments, through cognitive psychology, to architecture, graphic design, and more.

Generally, each researcher or practitioner has been interested in how people find their way through the context of their surroundings. They have each contributed to the debate and helped to define such issues as memory, cognitive mapping, spatial awareness and information processing. They have shed light on how we use our senses to interpret the physical world, form a plan of action, and execute that plan to reach a desired destination. Some have been interested in understanding the processes of way-finding whilst others have

developed theoretical structures. Application of this knowledge is evident in architectural practice and product design and there are designers working to mitigate way-finding problems and enhance the experience of being in a building.

The condition of visual loss is extremely complex and encompasses a broad spectrum of loss of visual function (Barker et al., 1995). It is in no way as clearly defined as everyday terminology often suggests. Definition of visual loss is a contentious issue as each person's experience is subjective. This makes categorisation an inappropriate action when translated into the realm of architecture and design. It is clear however, that there is a massive range of different types of visual ability and experience in relation to way-finding.

In current way-finding research there is a lack of a holistic understanding which incorporates a range of visual ability which is based on both positive and negative experience and is in relation to a real-world setting (Kitchin, 1997). This establishes the contextual background and a starting point for this research project.

This study has started to provide a research-based foundation to assess the problem area and provide an insight into the issues people with different visual abilities encounter as they undertake a Way-finding Journey around a building. Ten Participants with varying degrees of visual ability undertook a *Way-finding Scenario* designed to evaluate both existing memories of way-finding and present way-finding experience.

A new theory of way-finding – *The Experiential Charting of a Way-finding Journey* – emerged from the Participants' experiential data. This experiential data highlights the importance of five types of way-finding communication: *identification*, *orientation*, *navigation*, *warning* and *instruction*.

1.2 Research Position and Objectives

The aim of this research is to investigate way-finding experiences by people who have a range of visual ability within the context of a building. It is exploratory and descriptive. Rather than following a traditional line of hypothesis-testing it is more inductive in its research approach as it is focused on gathering accounts of experiential narrative of way-finding within a building.

In the beginning the Researcher's goals were: 1. to find what the problems of way-finding were, 2. design prototypes, and 3. make recommendations to mitigate the issues. However, it became obvious that this was naive based on a number of reasons:

- There was a lack of an existing, established theoretical framework and method to follow.
- There was no user-centred data which was based on depicting the holistic [the positive and negative] experience of way-finding within a building to work from.
- 'Disabled people do not all share a single experience of their impairment, and these experiences are inseparable from the rest of their lives' (Pullin, 2009,p. 7).
- 'designers do not follow a single approach to design, and each designer will even approach different briefs in different ways' (Pullin, 2009,p. 7).
- each building, space and environmental condition provides a different type of setting with different types of way-finding requirement. Each context needs to be considered within its own right. One size does not fit all and one approach may not be appropriate for every building [e.g. a way-finding strategy/intervention used in a hospital may not be easily transferable into an airport, shopping mall or school].

This research does not provide prescriptive recommendations. Instead it investigates the holistic experience of Way-finding. It focuses on both the inhibitors and the facilitators of Way-finding Journeys as well as the positive and negative experiences.

It develops a framework for architects and designers to not only enable, but also enhance, experiences of Way-finding by building users who have differing visual and sensorial needs. Through presenting user-centred experience of Way-finding Journeys it illustrates a method to enable architects and designers to empathise with users of their buildings.

The research has three clear key objectives:

- To synthesise and document how way-finding, visual loss, and specifically way-finding by people who have visual loss, is currently understood.

- To develop an appropriate Methodology and Set of Methods to investigate experiential components of way-finding suited to people with limited visual ability.

- To uncover, understand and translate the design issues [positive and negative] revealed by Participants who have a range of visual ability as they way-find in a large public building.

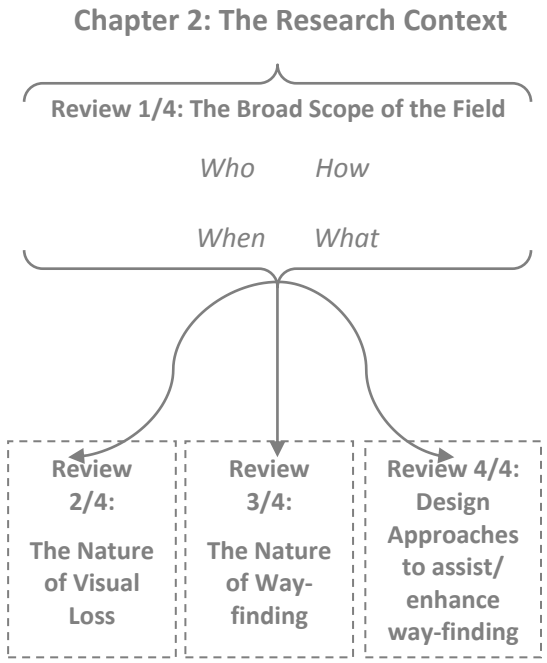

Figure 1.3: The Reviews of Chapter 2

1.3 Rationale: Collecting, Synthesising, Formulating and Structuring

The Way-finding Journey within a Large Public Building: A user centred study of the holistic way-finding experience across a range of visual ability.

Chapter 1 introduces the Thesis. The Research Themes – [1] *Experience of Way-finding in large Public Buildings* by [2] People who have a *Range of Visual Ability* – are established. The position of the research, line of enquiry, rationale and thesis outline are presented.

Chapter 2 provides an insight into the interdisciplinary literature context in relation to the Research Themes. In setting out to explore theories and practice in relation to way-finding and visual ability/loss, a vast and wide-based literature context was reviewed. Throughout this multi-disciplinary search the aim was always to explore concepts, ideas and projects which embraced the research themes whilst focusing the line of enquiry. Divided into four Reviews [figure 1.3] this Chapter mirrors the process the Researcher undertook when surveying the current research field.

Review 1 is an all encompassing 'scoping' of literature which identifies those who have either contributed to, or have a particular interest in, the research themes. The broad scope of the research is discussed and the scene is set to position this current research within the wider context. Within this Review the research field is introduced and the process of focusing the research scope is evidenced. The resources in relation to the Research Themes are presented in the form of a Contextual Review Guide which frames the content of each of the following focused Reviews.

Review 2 is focused on portraying the *Nature of Visual Loss* and provides insight into current literature [qualitative and quantitative] describing the issues surrounding visual loss. The world-wide scale of visual loss [as presented by the World Health Organisation and the Royal

National Institute for the Blind] is depicted and the impacts and challenges of visual loss are discussed. The definition of visual loss and the contentious issue of terminology is examined before three theoretical Models of Disability are investigated: The Medical Model of Disability, the Social Model of Disability (Oliver, 1990) and the Architectural Model of Disability (Goldsmith, 1997).

Review 3 is focused on portraying the *Nature of Way-finding* and assembles literature which contemplates understanding of human way-finding [especially within buildings]. Focusing on a body of literature concerned with human way-finding in the built environment, the concept, processes and structures of way-finding are presented. Terminology in relation to way-finding is defined and the question: *What is Way-finding?* is answered. Methods of understanding the processes of way-finding are investigated and theoretical models of understanding the processes of way-finding are discussed. Structures of *Way-finding*, *Architecture*, and *Network Analysis* which are used in areas of theory and practice are presented.

Review 4 is focused on providing an overview of *Design Approaches to Assist/Enhance Way-finding*. Literature from architectural and design practice is specifically drawn upon within this Review and a selection of precedent illustrates the current approaches of dealing with way-finding issues. A broad, world-wide overview and discussion of a selection of products and environments which are used to aid or enhance way-finding in a building are presented over a series of Profile Reviews.

Chapter 2 is concluded with a *Contextual Review Summary* which synthesises the summaries of all four *Reviews* as it defines the gap in current knowledge and begins to formulate the Research Questions.

It is important to note that the review of literature was not only an activity carried out at the beginning of this research study. Instead it was a constant activity which threads through the whole thesis, from forming the research foundation, to developing the methodology and method within Chapter 3. It is an activity which is especially revisited throughout Chapter 4 and 5 when the research findings are presented, analysed, discussed and finally concluded. A constant 'dipping' into the literature aided in crafting and moulding the entire study.

Chapter 3 demonstrates the purpose and rationale of the methodology and methods employed by the study. It presents the gap in current knowledge and states the research questions before focusing on the Research Design. As one of the most challenging periods of the whole process it is within this Chapter that the plan to answer the Research Questions is constructed. Learning from others, this represents a period in the process when a gathering of literature and theory in regard to methodologies and methods [used in research and practice] was carried out. In response to the Research Questions [and the gap in the knowledge], the design of the research study is presented through a sequence of Research Steps whereby, the methodology and methods along with the analytical process is demonstrated.

In the first step the Researchers Ontological and Epistemological Position is established. In the second step the foundations of the methodology are introduced by drawing on two established methodologies of Grounded Theory (Glaser, 1968) and Case Study (Yin, 2003a;Yin, 2003b). In the third step the research rational and theoretical framework for this research study is framed. Research Principles [built from the methodologies of Grounded Theory (Glaser, 1968), Case Study (Yin, 2003a;Yin, 2003b) and current practice] are established as a methodological foundation. In the fourth step the evolution of the Case Study - *A Way-finding Scenario* - is presented. In the fifth step the process to analyse the

Way-finding Scenario is discussed. This includes explanation of data collection, the process of coding and the hierarchical structuring of data. In the sixth step the use of the Research Principles are reflected upon.

Chapter 4 contains the main body of empirical studies. Participant's experiential narrative is presented through Participant quotes, paraphrasing and illustrations. The analysis of findings evidenced from the ten Way-Finding Scenarios is presented. This Chapter illustrates the generation of new knowledge and documents the analysis and discussion of findings in relation to two data outcomes*: Participant Profiles* and the *Experiential Charting of a Way-finding Journey.*

Chapter 5 forms a conclusion to the research findings. The Participant's experiential data and the new theory – *The Experiential Charting of a Way-finding Journey* – is considered in terms of content and in relation to contribution to new knowledge. This Chapter brings together the full themes and conclusions of this research. As well as highlighting the importance of the findings [discussed in Chapter 4], it considers and argues their significance in relation to the research questions and contextual literature. Three elements are the focus: the foundation concepts of A Way-finding Journey*,* the research outcome which is coined *The Experiential Charting of a Way-finding Journey,* and key themes extracted from the participant's experiences of way-finding.

Chapter 6 concludes the PhD journey with critical reflection and evaluation. The Researcher reviews the *way-finding* of this research process and suggests several ways to take the study of Way-finding Journeys forward. The research contribution [across multi-disciplinary fields of research, practice and education], significance and relevance of research findings, along with the successes and limitations of the study, are considered before speculative recommendations are made for future research.

Appendices

The appendices which accompany this thesis have an important role to play in documenting the process, training, and protocols which were followed by the Researcher.

- Appendix A provides details of the Way-finding Day Checklist and Debriefing procedures carried out by the Researcher.
- Appendix B presents a full record of the Participant Profiles and a Participant Profile Summary.
- Appendix C provides a hardcopy of a Participant's Way-finding Trace and a sample of Purposeful Conversation. A copy of all Participants' Way-finding Trace can be found in digital PDF format on the accompanying CD.
- Appendix D documents the Ethical Application and Approval Documentation.
- Appendix E provides a record of Data Registration.
- Appendix F presents a record of the Researcher's Academic Dissemination of the Research.
- Appendix G provides a record of Training undertaken by the Researcher.

The full **Thesis Outline** is summarised in figure 1.4.

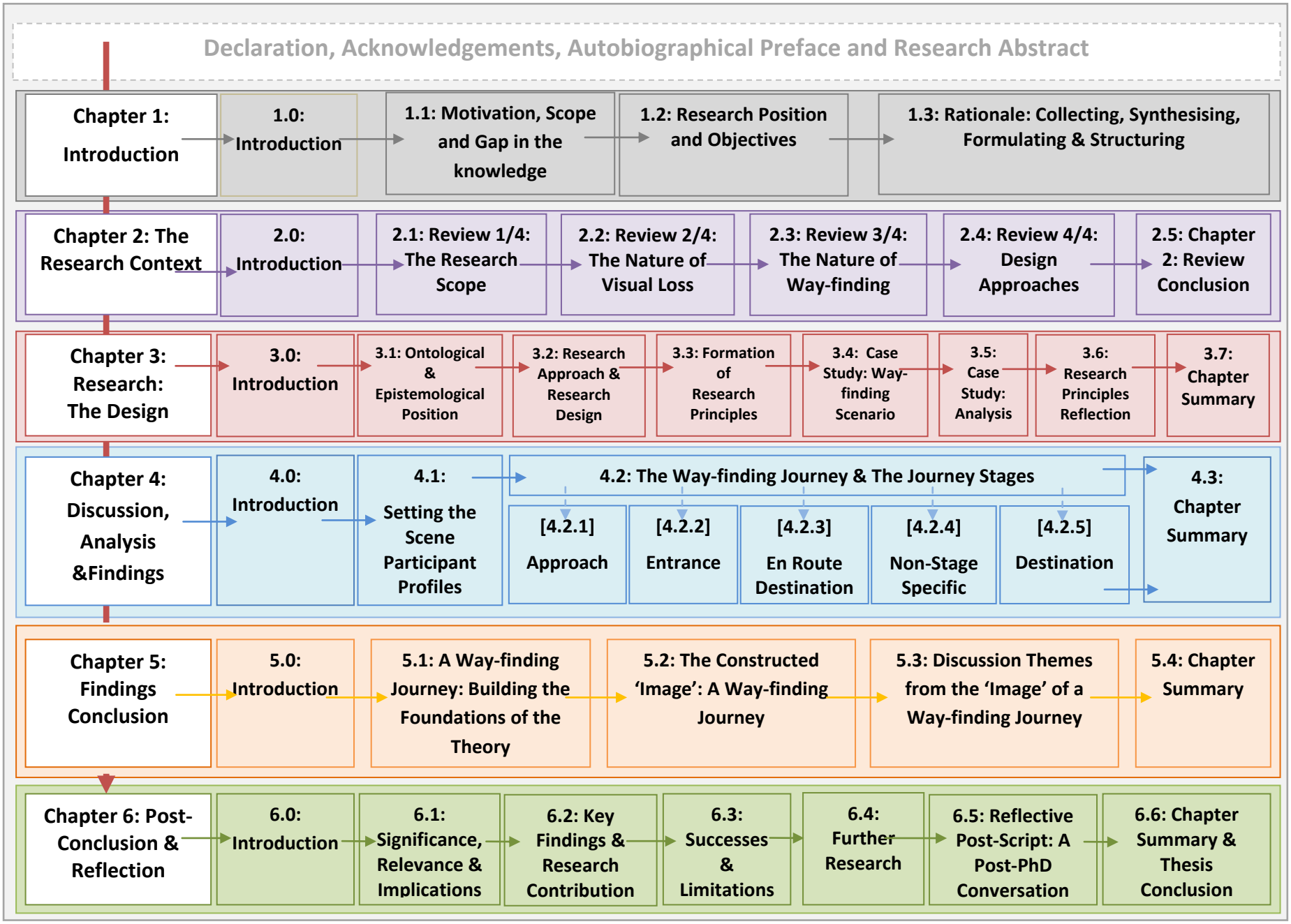

Figure 1.4: Thesis Outline

Chapter 2

2.0 The Research Context

Four Reviews

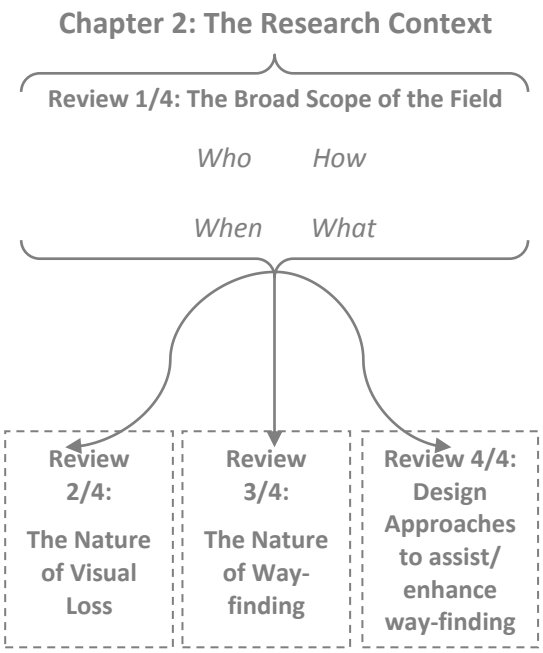

Figure 2.0: Focusing the Scope of the Research

2.0 Chapter Introduction

The Way-finding Journey within a large public Building: A user-centred study of the holistic way-finding experience across a range of visual ability.

The purpose of this Chapter is to build and synthesise a knowledge-base of current theoretical and empirical research based around the two major research themes: [1] *Experience of Way-finding in large public buildings,* by [2] People who have a *Range of Visual Ability*. Throughout this Chapter the field, in relation to the Research Themes, will be examined and the gap[s] in existing knowledge will be surveyed.

The formation of this Contextual Review was not straight forward. 'Technical' and 'Nontechnical' (Strauss and Corbin, 1990,p. 48) literatures from a range of disciplines, practices and perspectives have been utilised to build a foundation to support and guide this research. It has been a complicated and challenging process which has taken the Researcher into areas of social sciences, optometry, philosophy, architecture and disciplines of design, building legislation, behavioural geography, psychologically, anthropology, technology design and many more.

This Chapter, which is presented over four Reviews, will document this interdisciplinary context in relation to the Research Themes and will lead to the formulation of a Research Question which is stated in Chapter 3.

In **Review 1 the Broad Scope of the Research** is discussed. Resources in relation to the Research Themes are introduced by considering: ***Who*** *has written/researched in relation to one or both of the research themes?* ***When*** *and* ***How*** *have they researched the themes?* and ***What*** *has been found?* Review 2, 3 and 4 are the focused result of Review 1 [figure 2.0] and the formation of a *Contextual Review Guide* frames the content of each of these Reviews.

In **Review 2 the Nature of Visual Loss** is discussed. The objective is to provide insight into current literature describing the issues surrounding visual loss. It achieves this as it answers *What is the nature of visual loss? What are the challenges and impact of visual loss?* and *How is visual loss understood and categorised?*

In **Review 3 the Nature of Way-finding** is discussed. Terminology in relation to way-finding is outlined and theoretical models of understanding the processes of way-finding are reviewed. In addition to this, structures which are used in architectural and design theory and practice are also presented. It answers: *What is Way-finding? How has way-finding been categorised and understood?* and *Who has described aspects of way-finding that are non-visual or partially visual?*

In **Review 4 the Design Approaches to Assist/Enhance Way-finding** are discussed. A broad, world-wide overview and discussion of products and environments which are used to aid or enhance way-finding in a building is presented. It answers: *Who has designed products or environments to aid/enhance way-finding within public buildings? How do these aid way-finding?* and *How can these way-finding approaches be categorised?*

The **Contextual Review Conclusion** ties together the summaries of all four Reviews. Presented as a series of four succinct paragraphs, it establishes the full literature context and outlines the gap[s] in existing knowledge.

Figure 2.1 provides an overview of Chapter 2.

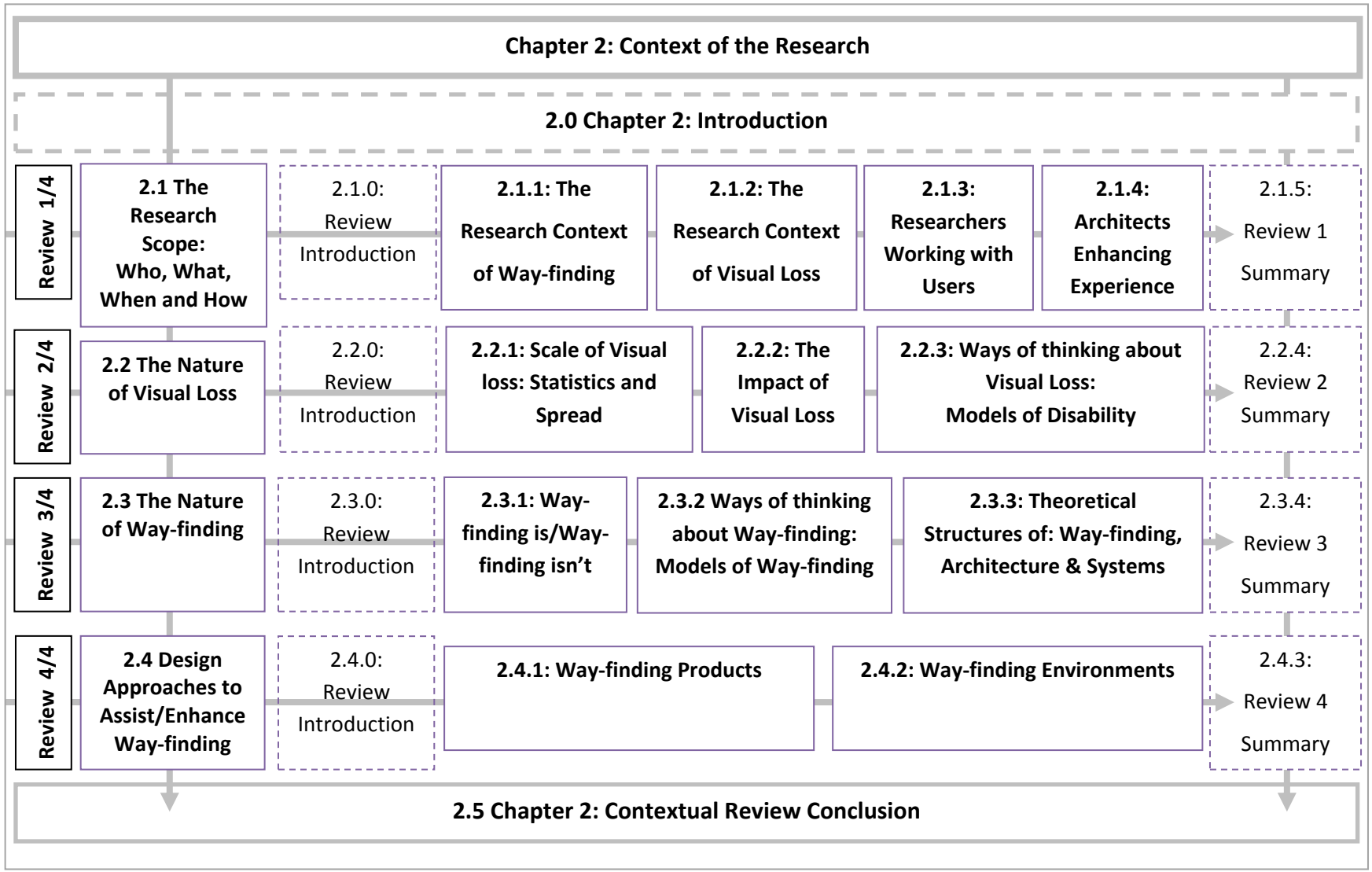

Figure 2.1: Chapter Outline

Chapter 2

2.1 Review **1/4**

[The Research Scope]

An Introduction and Synthesis of the Field

‘Visual impairment and blindness are the most obvious

and severe perceptual impairments affecting way-finding’

(Arthur and Passini, 1992,p. 63).

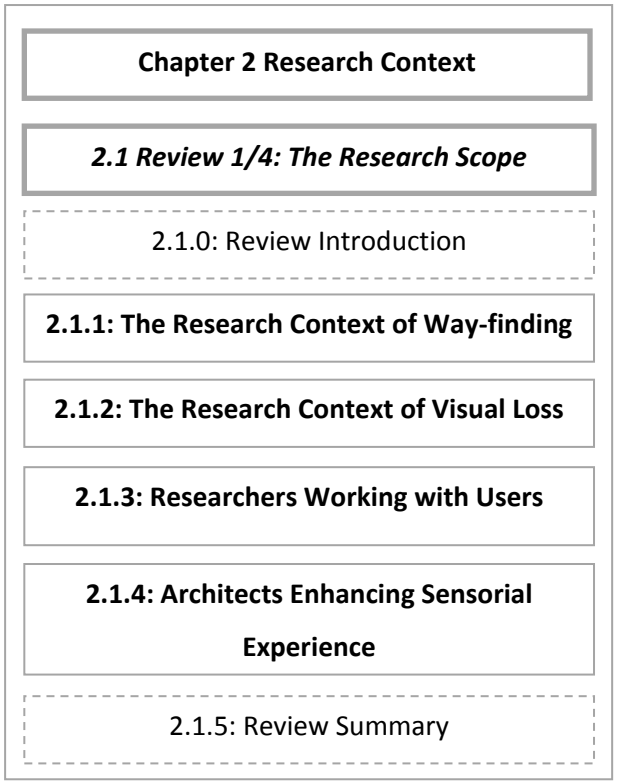

Figure 2.1.0: Review 1 Outline

2.1.0 Review Introduction

Review 1, outlined in figure 2.1.0, will encompass a broad base of literature from different disciplinary perspectives. Its purpose is to survey and synthesise the field of research and practice and identify who is working in relation to the Research Themes. It documents the positioning of this current research within the wider context of the research field before three focused Reviews are investigated. Throughout each section of this first Review the Researcher collected a series of cues [highlighted by a text box] which fuelled and focused the scope. This is how the problem area was defined and the line of enquiry was mapped.

Section 2.1.1 The Research Context of Way-finding, identifies those researchers working within the theme of way-finding. The research context in relation to way-finding is mapped and the influential researchers from a range of disciplines are identified. Particular attention is paid to Arthur and Passini (1992) as they provide a fundamental resource in relation to both Research Themes.

Section 2.1.2 The Research Context of Visual Loss, highlights Researchers working within the theme of visual loss. Particular attention is paid to social science research carried out by user group representatives [e.g. sight-loss charities] in relation to research regarding visual loss and the built environment.

Section 2.1.3 Researchers Working with Users, identifies researchers who adopt user-focused methodologies.

Section 2.1.4 Architects Enhancing Sensorial Experience, identifies those working to enhance the holistic sensorial experience of being in a building.

Section 2.1.5 Review Summary, concludes Review 1 and introduces the following three Reviews.

2.1.1 The Research Context of Way-finding

As a topic of research and practice, Way-finding has been investigated throughout disciplines of urban design (Lynch, 1960), geography (Golledge, 1999), virtual environments (Ruddle and Péruch, 2004), cognitive psychology (Downs and Stea, 1973a;Downs and Stea, 1977;Foulke, 1971;Downs and Stea, 1973b), architecture (Arthur and Passini, 1992) (Hillier, 2007), graphic design (Berger, 2005), and more still.

At a general level, each researcher/practitioner has been interested in how people find their way through the context of their surroundings. Some have been interested in understanding the processes of way-finding whilst others have developed theoretical structures.

The term *Way-finding* was initially introduced by Architect and Urban Designer Kevin Lynch in his text 'The Image of the City' (Lynch, 1960). In this much-referenced work he investigates how cities are perceived by inhabitants. He proposes a new concept of 'imageability' to characterise the way people construct mental images of their environments. He explores how people use the 'image' as a method to way-find throughout the city and identifies that way-finding problems occur when a city lacks legibility, form and features of distinction.

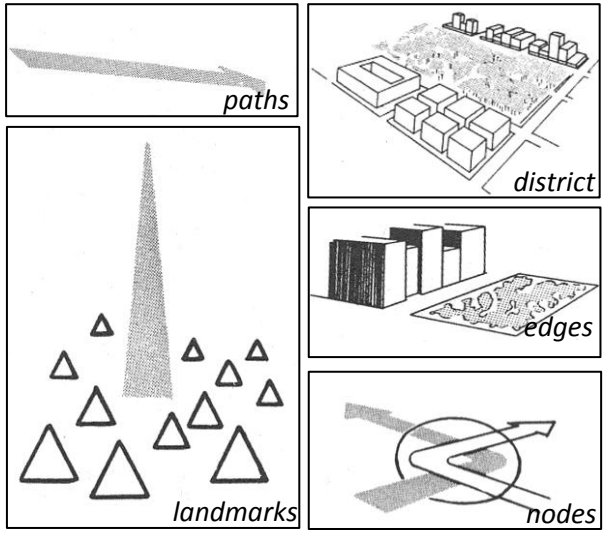

Figure 2.1.1: Lynch's Elements of the Image

Lynch's model, based on five elements [figure 2.1.1] has a distinct visual bias. This is evident in the extremely visual-based language he uses to describe and define the 'image' [figure 2.1.2].

Lynch's work remains extremely influential through disciplines of architecture, urban planning, environmental design and psychology. Whilst his work has inspired others in developing understanding theoretical processes and structures, it has also been criticised.

'visual plan' (pp 116,194), *'visual form'* (pp 27,33,147,149,153,155,156,), *'visual exposure'* (p. 51), *'visual prominence'* (p. 51), *'visual character'* (pp 49,94,104), *'visual closure'* (p. 55), *'visual education'* (p. 120), *'visual world'* (p. 120), *'visual chaos'* (pp 5, 55), *'visual clues'* (p. 55), *visual perception'* (pp 54, 202), *'visual problems'* (p. 156), *'visual clarity'* (pp 13, 56), *'visual interconnection'* (p. 13), *'visual quality'* (pp 2,134), *'visual analysis'* (pp 144,160), *'visual environment'* (pp 93,109), *'visual success'* (p. 93), *'visual importance'* (p. 82), *'visual images'* (pp 30,31), *'visual essence'* (p. 145), *'visual impression'* (p. 76), *'visual identification and structuring'* (p. 95), *'visual interest'* (p. 74), *'visual scope'* (pp 98,106,194), *'visual imageability'* (p. 81), *'visual sensations'* (p. 3), *' visual material'* (p. 41), *'visual reality'* (p. 14), *'visual content'* (p. 86), *'visual structure'* (p. 26), *'visual landmarks'* (p. 83), *'visual relation'* (p. 65), *'visual connection'* (p. 20), *'visual recognition'* (p. 8), *'visual dominance'* (p. 44), *'visual evidence'* (p. 92), *'visual elements'* (pp 179,193), *'visual exposure'* (pp 98,170), *'visual sub-areas'* (p. 167), *'visual characteristics'* (p. 167), *'visual role'* (p. 181), *'visual stability'* (p. 171), *'visual hierarchy'* (p. 96), *'visual identity'* (p. 180), *'visual eminence'* (p. 173),

(Lynch, 1960)

Figure 2.1.2: The dominant visual language Lynch uses in relation to the 'Image'

Michel Conan (2003) advances the view that Lynch's work 'stems from a theoretical rather than methodological concern' and claims this theory is missing the 'non-cognitive aspects of human experience' (p. 7). In highlighting that Lynch makes no attempt to explore experiential narrative of people using the city, Conan expresses concern that there is a lack of motive in understanding how 'motion within the city is experienced' (p. 8).

There are various types of Process Models and Structures which exist in way-finding, architecture, and network modelling. Process Models include: Cognitive Mapping Model (Downs and Stea, 1977), a Skill Model (Ingold, 2000), an Information Processing Model (Arthur and Passini, 1992), a Process of Locomotion Model (Hersh and Johnson, 2008,p. 172), and a Travel Task Framework (Harper and Green, 2000).

Types of Structures include: ***Way-finding Structures***, such as Donald Appleyard's (1970; 1969) Coding Structures of the City [which can be traced to Lynch's (Lynch, 1960) work]; Network Structures, such as Space Syntax (Hillier, 2007) and IDEO's User Sequence Modelling (Myerson, 2001); and Architectural Structures, such as Arthur and Passini's (1992) Architectural Way-finding Communications, Unwin's (2000) Basic Elements of Architecture and Ching's (1996) Basic Elements, Systems & Orders.

Each of these Processes and Structures provide insight into current understanding of way-finding, architecture and network modelling and are investigated further within Review 3.

Thirty years after Lynch, Romedi Passini [Architect and Environmental Psychologist] and Paul Arthur [Graphic Designer] focused much of their work on understanding way-finding within the context of a building [as opposed to the city]. Collaborating in the 1992 text 'Wayfinding: People, Signs, and Architecture' (Arthur and Passini, 1992) they have presented the most complete synthesis of research exploring the task of way-finding by way of architectural

layout, signage and environmental cues. They identify way-finding as being a crucial element in the design of buildings. When considering human variables and way-finding, Arthur and Passini (1992) acknowledge that everyone, regardless of ability, can experience difficulty when way-finding. Therefore their work is not focused on a specific type of way-finder. Instead it is based on the general way-finding problems experienced by different groups of people in buildings. They suggest five types of building user [figure 2.1.3].

1. The user who is 'unimpaired' - 'adults without serious perceptual, mental, or physical disabilities'

2. The user who has 'Perceptual Impairment'

- 'Sight impaired: persons with poor eyesight, partial vision, or anomalies of vision such as colour deficiency and reduced visual field.
- Blind: persons without useful vision.
- Hearing impaired: persons who have a moderate to severe hearing loss, and have to rely on hearing aids
- Deaf: persons who have a profound hearing loss'

3. The user who has 'Cognitive Impairment'

- 'Situational impaired: persons who are in temporary state of anger, apprehension, confusion, or distress caused by a particular situation or environment; persons over loaded with information.'
- 'Developmentally impaired' – defined as people who have challenging learning needs and 'elderly persons who have reduced cognitive abilities'

4. The user who is 'Literacy impaired**:** persons who are functionally illiterate in the language in which the message in an information display is expressed.'

5. The user who has 'Mobility Impairment'

- 'Mobility impaired who can walk: persons who have impaired strength, endurance, dexterity, balance, or coordination; persons using

Figure 2.1.3: The Types of Building User According to Arthur and Passini (1992,pp 63-73)

Arthur and Passini (1992) claim that 'way-finding problems posed by certain buildings may be just too much for sections of the population to cope with' (p. 10). They highlight that the problems of way-finding experienced by people who have perceptual impairment lie in a lack of empathy and focused agenda to uncover and mitigate the problems. In drawing particular attention to the impairment of visual loss, they declare that 'visual impairments and blindness are the most obvious and most severe perceptual impairments affecting way-finding' (p. 63). They stress that visitors with visual loss are met by barriers which can result in negatively affecting their independence in way-finding. They describe these barriers as being 'not as visible as an architectural barrier is for a wheelchair user, but just as effective' (p. 64).

In proposing two reasons as to why the problems experienced by people with visual loss exist they argue that:

1. Although the idea of way-finding is accepted as an element of architecture and design, its complete potential, consideration and appropriate implementation is still to be realised

2. The sighted way-finder/designer is not always able to translate their surroundings into forms of way-finding communication that are of a non-visual nature – 'the sighted population puts less effort into understanding settings in order to get around and this affects information giving' (Arthur and Passini, 1992,p. 66).

When assessing the factors which lead to way-finding difficulty they highlight that architectural features including: the legibility of entrance, circulation, architectural features and the expression of interior and exterior spaces are vital to provide an efficient architectural way-finding environment. They also explain that way-finding communications – 'the graphics' – need to support the way-finder as opposed to presenting the hierarchical

structure of the people or services housed in the building. They specify that communications need to be presented in a format which is legible and understandable, positioned where they can be seen, and portray a message which is clear, concise and accurate.

Another researcher, Professor Reginald G. Golledge (1993; 1999) [Behavioural Geographer] added to the debate when he identified that people with visual loss face challenges in regard to independent travel. He emphasised that as a discipline, geography paid little attention to how they could help mitigate the issues experienced in the built environment. He identified a lack of research in his field and attempted to address it based on the premise that visual loss impacted significantly on independent travel. He makes two major points:

1. 'The ability to travel independently liberates the blind or visually impaired person from being a passive participant in such activities' (Golledge, 1993,p. 71).

2. Spatial decisions have to be made regardless of visual ability and the nature of the spatial environment should be the stage to provide for these differences (Golledge, 1993).

He also recognised the difficulty in uncovering how to represent these differences. He explains that people have difficulty in relaying narrative of their way-finding because it is not always a conscious process they are aware of carrying out (Golledge, 1999).

'visual impairment and blindness are the most obvious and most severe perceptual impairments affecting way-finding' (Arthur and Passini, 1992,p. 63). This cue, along with the Research Themes, leads Review 1 to explore within the area of visual loss research.

2.1.2 The Research Context of Visual Loss

> 'WHO is the directing and coordinating authority for health within the United Nations system. It is responsible for providing leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options, providing technical support to countries and monitoring and assessing health trends'
>
> (Organization, 2010)

Figure 2.1.4: WHO's Manifesto

Statistically, visual loss [scale and extent] is monitored around the world by the World Health Organisation [manifesto outlined in figure 2.1.4] (Organization, 2010;World Health Organization, 2010a;World Health Organization, 2010b;World Health Organization, 2010 ;World Health Organization, 2004;World Health Organization, 2009).

The Royal National Institute for the Blind also provide statistics of people who have a visual loss in the UK (2009a).

In addition to the quantitative extent of visual loss, there are also researchers who investigate the qualitative effects of visual loss [including the psychological impact and the daily challenges] (Rahman, 1955;Carroll, 1961;Abolfotouh and Telmesani, 1993;Action for Blind People, 2011;Adams and Pearlman, 1970;Baker, 1999;Barker et al., 1995;Bowen, 2010 ;Stedman and RNIB Emotional Support Service, 2009;De Leo et al., 1999;Kaye and Royal National Institute for the Blind, 2009;Royal National Institute for the Blind, 2009b;Royal National Institute for the Blind, 2010 ;Royal National Institute for the Blind, 2011;Pavey et al., 2002).

Theories of understanding disability and impairment [in relation to visual loss] have also been advanced by researchers, practitioners, disability activists and social researchers. Such models of disability include: the Medical Model of Disability (Fraser. S et al., 2001), the Social Model of Disability (Oliver, 1990) and the Architectural Model of Disability (Goldsmith, 1997). These Models of Disability will be further explored and described within Review 2/4.

1. ‘To consider how best to improve the built-environment, allowing visually impaired people to move around independently, safely and without restriction, as pedestrians, public transport users and public building occupants.
2. To enlist the support of Central Government, Local Authorities, transport operators and other relevant organisations to achieve this aim.
3. To encourage related research that would benefit blind, deafblind and partially sighted people.
4. To support mobility training of blind, deafblind and partially sighted people.
5. To undertake any other relevant activities which will help the above.’

(Joint Committee on Mobility of Blind and Partially Sighted People, 2008)

Figure 2.1.5: JCMBPS’s Objectives

The User Group Representative: Sight-loss Charities

In recent years there has been an increased amount of literature presented by UK sight-loss charities recognising that people with visual loss are experiencing mobility problems within the context of the built-environment. In particular: The Joint Committee on Mobility of Blind and Partially Sighted People, The Royal National Institute for the Blind, The Guide Dogs for the Blind Association and the Dog Rose Trust are groups working within the research themes.

In 2008, the ‘Joint Committee on Mobility of Blind and Partially Sighted People’ [1] was established in the UK to act as an umbrella organisation to charities supporting the manifesto that ‘blind, deaf-blind and partially sighted people should be able to move around and use buildings, streets and transport facilities safely and independently’ (Joint Committee on Mobility of Blind and Partially Sighted People, 2008).

Figure 2.1.5 illustrates JCMBPS’ five objectives to mitigate the barriers people with perceptual impairment encounter within the built environment.

The Royal National Institute for the Blind

Independently from JCMPBS and more focused on the visual loss and the built environment, The Royal National Institute for the Blind [RNIB] have published three key texts which are fundamental to this research: ‘Building Sight: a handbook of building and interior design solutions to include the needs of visually impaired people’ (Barker et al., 1995), ‘Rights of

[1] Existing as an independent body, principle charities involved in the JCMBPS include: The Guide Dogs for the Blind Association (Guide Dogs), the Royal National Institute for the Blind (RNIB), St Dunstan’s, the National Federation of Blind People (NFB), the National League of Blind and Disabled People, the National Association of Local Societies of Visually-Impaired People (NALSVI), The Social Care Association, the Circle of Guide Dog Owners, Assistance Dogs UK and Access Association.

way : transport and mobility for visually impaired people in the UK' (Baker, 1999) and 'Travellers' Tales: Making journeys safer for blind and partially sighted people' (Yerassimou, 2002). These studies, along with the work carried out by The Royal National Institute for the Blind will now be considered as their work is also relevant to the Research Themes.

Founded in United Kingdom in 1868 by Thomas Armitage, the Royal Institute for the Blind [RINB] 'exists to challenge blindness'. They aim to do this: 'By providing services that help visually impaired people to determine the quality of their own lives; By questioning society's assumptions – and therefore its attitudes, behaviour and actions concerning people with visual disability' (Barker et al., 1995,p. 7). RNIB identify that although they can minimise the many personal impacts of visual loss, they cannot resolve what they describe as, 'barriers arising from uninformed attitudes and an unsympathetic built-environment' (Barker et al., 1995,p. 7).

The built environment is failing people who have a visual loss and Barker et al. (1995,p. 16) project a clear point: 'good architecture and design will empower and integrate all people'. Barker [who is visually impaired], Barrick, and Wilson [who is registered blind] (1995), state that forms of 'prejudices', 'stereotypes' and 'ignorance' towards disability and impairment in terms of an accessible built-environment need to be mitigated amongst built-environment professions.

Although clarifying that designing for the needs of everyone would be difficult, they suggest that a built-environment which includes the requirements of a broad spectrum of users is of great relevance and importance (Barker et al., 1995). These thoughts are echoed in their manifesto [figure 2.1.6].

'Our philosophy is to advocate design for all – and that means design that reconciles the needs of visually impaired people with the general scheme of things. Only when this kind of thinking enters the mainstream of building design can we begin to claim the equality of opportunity which should surely be the hallmark of any civilised society.'

(Barker et al., 1995,p. 10)

Figure 2.1.6: Barker et al.'s (1995) Manifesto

To fulfil this objective they highlight that it is vital that architects and designers have an understanding of visual loss in order to create environments which are responsive to different needs. They provide critical discussion based around two aspects of built-environment design which the Researcher terms: 1. Specialist Architecture and 2. Thoughtless Architecture.

1. Specialist Architecture

Barker et al.(1995) advanced the view that specialist architecture, which is designed for people who have sensorial impairment, is not practical, possible or beneficial to any user [regardless of ability]. They explain that design concentrated on users who are blind creates an unattainable architecture which is only helpful to a small number of people. In these instances they recognise that the needs of people who had different forms of visual loss [i.e. those who were not blind] are not be provided for. They explain, based on opinion from people with visual loss, that specialist architecture is not the answer when trying to making architecture more widely accessible. Instead of mitigating problems potentially makes matters worse when the person, who is blind, visited a non-specialist building (Barker et al., 1995).

2. Thoughtless Architecture

In contrast to this extreme of *specialist architecture* being inappropriate, Barker et al. (1995) argue that design interventions in buildings do not always fulfil the needs of the visitor with visual loss. They state: 'Too often token planning gestured towards disabled people seems to add cynicism to thoughtlessness: […] the Braille invitation into an environment that, once entered, proves positively hostile to visually impaired people' (p. 8).

To combat this problem they identify that it is vital that the user becomes involved in the design process: 'the individual user is always the best judge of any building modification' (Barker et al., 1995,pp 18-19).

This text, produced over 15 years ago, is currently the most recent publication [apart from Building Regulations] attempting to specifically understand visual loss and the internal building environment. It is unclear if the publication has been accepted and used by architects and designers as guidance to make buildings and environments more accessible to people who have visual impairment. Although it offers guidance to designers, two specific weaknesses have been noted by this Researcher. There is a distinct lack of:

- user involvement or methodological outline

  At no point throughout the text does it imply that individuals or user groups who were blind or had a visual impairment [with the exception of the authors] had been part of the research. There is no evidentiary support of the suggested recommendations.

- a balanced, holistic account

  It is also noted by the researcher that there was lack of discussion based around the positive experiences of design which people who are blind or who had a visual impairment found helpful or joyful. Instead only negative aspects of problematic design were identified.

The authors make an attempt to justify their recommendations by stating that the 'publication reflects knowledge, expertise and experience gained by RNIB over a long history'. They add*:* 'experience tells us that as circumstances change so must our responses […] more research will have to be done before we can arrive at informed recommendations' (Barker et al., 1995,p. 9).

‘**Awareness** - The vast majority of visually impaired people feel that people are unaware of their needs when getting out and about. From pedestrians and other road users, to local and national Government, everyone needs to be more aware of the particular needs of blind and partially sighted people.’

‘**Uniformity** - Blind and partially sighted people find the lack of uniformity within the transport system frustrating and potentially hazardous. Greater uniformity in the design of public transport vehicles and the provision of information would increase the confidence of visually impaired people using public transport. Furthermore, more uniformity in the policing of road and pavement hazards is necessary if visually impaired people are to feel safe in those environments.’

‘**Access** - Visually impaired people want to travel independently whenever possible. Improved access to information in a variety of formats, and greater physical access to vehicles and termini are absolutely vital to allowing them to achieve this independence.’

Figure 2.1.7: Problem Areas of Mobility and Transport (Baker, 1999,p. 5)

External Built-Environment Studies

More recent research studies carried out by the RNIB (Baker, 1999;Yerassimou, 2002) have focused on the mobility of people who have visual loss in the external built-environment. These studies are important to this current research as they focus on the user, however they are based within the external built-environment as opposed to the internal conditions of a building.

In the text, ‘Rights of way : transport and mobility for visually impaired people in the UK’ (Baker, 1999), the dimensions of independent travel with a visual impairment within the external built-environment are discussed.

This research project was based in the UK in 1998-1999 and encompassed:

- A UK based telephone survey of 800 people who have a form of visual loss
- 18 focus groups carried out with people who have a form of visual loss
- A survey of local sight-loss associations and societies
- A postal questionnaire which was undertaken by train and bus companies
- A postal survey which was undertaken by UK-wide Police Forces

The objective was to ‘provide RNIB with a mandate for encouraging both the continuation of current good practice and for change, where change is necessary’ (Baker, 1999,p. 24). Experiential narrative in relation to mobility and transport experiences of people who have a visual impairment was gathered from focus groups and categories of ‘Awareness’, ‘Uniformity’, and ‘Access’, [figure 2.1.7] emerged as the problem areas (Baker, 1999,pp 4-5).

- *Mobility Training* which was recognised as being an essential skill in terms of safe mobility however was highlighted as a skill that not all people who are blind or have a visual impairment possess.
- *Street Furniture* [such as bins etc.]
- *Pavement Hazards,* [such as tree branches, paving etc.]
- *Other road users* [pedestrians and drivers]
- *Cyclists on the footpath*
- *Cars parked on the pavement*
- *Road crossings* [a lack of demarcation]
- *Tactile paving* [a lack of uniformity and placement].

Figure 2.1.8: Issues in relation to Mobility and the Street Environment (Baker, 1999)

Within this study, specific issues were identified and broken into groups: 'Mobility and the street environment', 'Buses', 'Trains', 'Taxis and minicabs', and 'Other forms of transport' [which included coaches, underground trains, ferries and school travel]. These categories were used to structure the data in an attempt to clearly identify issues which needed to be addressed in the pursuit of making travel options available to those who were blind or had a visual impairment.

The category *Mobility and the Street Environment* is of particular relevance in terms of the themes of this research. Baker (1999) recognises that the street environment plays a major role in enabling people with a visual impairment to gain access to transport facilities and buildings. There were eight issues identified [figure 2.1.8] which impacted on the ability and safety of the person with visual loss as they negotiated within the external built-environment.

Following on from this research, the RNIB published the 21 Campaign Report Document, 'Travellers Tales: Making journeys safer for blind and partially sighted people' (Yerassimou, 2002). Within this study accounts were gathered based on experiences of daily travel from people who had a visual impairment. The findings identified problem areas within public transport systems and the external built-environment. They highlight participants' experiences of encountering problems regarding mobility, independence and safety and recommendations made are evidenced by the voice of the users (Yerassimou, 2002).

These external studies were real-world enquiries (Robson, 2002). This is a strength of both these studies compared to 'Building Sight: a handbook of building and interior design solutions to include the needs of visually impaired people' (Barker et al., 1995).

The Guide Dogs for the Blind Association

Established in 1934, The Guide dogs for the Blind Association 'provide mobility and freedom to blind and partially sighted people. [...] campaign for the rights of people with visual impairment, educate the public about eye care and fund eye disease research' (The Guide Dogs for the Blind Association, 2009). Principle campaigns relevant to the Research Themes of this study, however still immersed within the external environment, include:

'Access for All' campaign which was launched in 2000 with the mission to 'ensure that guide dog owners receive the same treatment as everyone else and lead the fullest and most independent lives possible' (The Guide Dogs for the Blind Association, 2011a).

'Re-thinking rehabilitation' campaign which aims to raise awareness and encourage government to address problems in relation to their finding that 'many blind and partially sighted people still face social exclusion due to under-investment in rehabilitation services' (The Guide Dogs for the Blind Association, 2011b).

'Safer Streets' campaign (The Guide Dogs for the Blind Association, 2011c) which resulted in the booklet 'Inclusive Streets: Design principles for blind and partially sighted people' (Bright, 2010) as well as an 'A-Z Guide to Street Obstacles' (The Guide Dogs for the Blind Association, 2004) [which takes the reader on a journey along the fictional 'Slalom Street' and highlights hazards that have been identified by guide-dog owners].

'Shared Surface Streets' campaign was the result of a two-year research project which investigated problems and solutions of shared surface streets. Originating in Holland, the concept of shared surface streets [in this instance termed 'Shared Space'] is outlined by the Interreg IIIB project (2005)as:

‘Shared Space helps to generate public spaces where traffic, social and all other spatial functions can be in harmony – people can move, meet each other, do things together or get to know somewhere. Social space is designed in such a manner that we do not conceive it as traffic space, but as people space – a space where the social functions of the public space take centre stage. A person travelling through is aware of the fact that he is a guest because of the layout of the space, and in response he adjusts his traffic behaviour to the social behaviour of the context.’

Contrary to these aims of shared space, findings from research carried out by The Guide Dogs for the Blind which involved two separate studies of focus groups in the UK (Thomas, 2006a), and Holland (Thomas, 2006b), evidenced that people who have visual loss fear that their safety is being jeopardised. They can no longer use the environmental cues which they are trained to use as part of Orientation and Mobility Training [such as raised kerbs etc.]

Major problems experienced by the focus group were the cause of not being able to:

- differentiate between ‘safe’ and ‘unsafe’ areas to walk as the distinctions between footpaths and roads were not defined
- cross the road safely due to lack of defined crossing points
- orientate using clues that were previously provided by materials and landmarks (Thomas, 2006a;Thomas, 2006b)

It was reported that these issues created an undermining of confidence and independence within the user. They chose to avoid areas of shared surface and undertook different, and sometimes longer routes to get to their destinations (Thomas, 2006a).

Figure 2.1.9: Guide Dogs 2010 Advertising Campaign (The Guide Dogs for the Blind Association, 2010)

[Please note that this Campaign is now called 'Streets Ahead']

In 2010 a campaign against 'Shared Streets' (The Guide Dogs for the Blind Association, 2010) was launched and resulted in the commissioning of a joint statement[2]. Collectively, message of this campaign was [figure 2.1.9] a rejection of the Shared Streets vision.

Research carried out by The Guide Dogs for the Blind Association remains focused in the domain of the external environment.

it is vital that the user becomes involved in the design process: 'the individual user is always the best judge of any building modification' (Barker et al., 1995,pp 18-19).

This cue, along with the Research Themes, leads Review 1 to explore Researchers who are working within the realm of user-centred research and design.

[2] The Joint Statement was published by The Guide Dogs for the Blind Association on behalf of; Action for blind people, the National Deaf Children's Society, the Kent Association for the Blind, The Omnibus Partnership, Transport for All, the Council for Disabled Children, Community, the National Blind Children Society and Action Disability in Kensington and Chelsea, The National Association of Disabled Supporters, the Trade Union Congress in London, The Access Association, Leonard Cheshire Disability, the National Association of Societies for Visual Impairment, the National Federation of the Blind in the UK and the National League of the Blind and Disabled. Radar, Disability Alliance, Deafblind UK, the Scottish Disability Forum, Arthritis Care, the Association of Blind Asians, Inclusion Scotland and the Joint Committee for the Mobility of Blind and Partially Sighted people, Capability Scotland, Disability Wales, the Royal National Institute for the Blind, the Joint Committee for the Mobility of Disabled People and Dogs for the Disabled, Mencap, The Inclusive Mobility and Transport Advisory Committee NI, Scope, the Royal National Institute for the Deaf, Tendring Community Transport, the National Autistic Society, Sense, the UK Disabled People's Council and Dog Aid.

2.1.3 Researchers: Working with the User

'For many designers, user research is already an essential part of design, and this is the result of pioneering and groundbreaking work of designers and design researchers that have brought the issue to the forefront.' (Lee et al., 2008)

There are established design groups, researchers and practitioners who employ a user-centred design approach within their work. Generally, the focus is on a person's experience in relation to using products and environments. Research and design groups working in this way include: IDEO, IDeA, Maketools, i-design[3], Danish Design Centre, I'DGO, Inclusive Design for Getting Outdoors[4], the Research Group for Inclusive Environments [RGIE], The Interdisciplinary Disability Research Institute [within the School of Education, Social Work and Community Education at the University of Dundee], and the Digital Media Access Group [within the School Computing at the University of Dundee].

They have each recognised the importance of the user's voice to design and therefore meet the needs of a more diverse population.

i-design are a particular group who encourage user involvement in the design process and provide an online resource – designing with people.org (i~design et al.) - which presents methods of engaging designers and users with all aspects of design in relation to recruiting, methods and ethical considerations.

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3 **I-design** consists of project partners: Helen Hamlyn Centre for Design Royal College of Art, Engineering Design Centre University of Cambridge, The Well-being Institute University of Cambridge and Loughborough Design School University of Loughborough.

4 **I'DGO** consists of groups from a range of UK based Universities: OPENspace Edinburgh College of Art and Herriot-Watt University; WISE -Wellbeing in Sustainable Environments Oxford Institute for Sustainable Development OISD, Oxford Brookes University, and, SURFACE at the University of Salford]; RGIE, the Research Group for Inclusive Environments; and the Design for all Foundation.

In regard to themes of disability and design, Pullin (2009) positively celebrates that design can be inspired by disability as opposed to being something which is based on regulatory compliance. User involvement is a fundamental way to encourage this creativity and is a way for designers to gain knowledge about disability. As Pullin points out:

> 'Many of the designers I spoke with did feel inhibited by not knowing enough about disability. No wonder, considering this is a territory that demands disabled people and other expert co-designers. So I think that it comes down to those already engaged in designing for disability to invite designers in' (Britt, 2009).

Pullin (2009) states that 'new directions will emerge when individual designers work on specific projects with disabled people.' The outcome of which, he suggests, 'is likely to produce quite different results each time, but a richness of complementary and even contradictory responses is what design and disability still needs and deserves'(p. 7).

These ideas of experiential qualities along with a re-occuring point regarding the visual dominance of architecture [e.g. Lynch] create a cue which, along with the Research Themes, leads the Review 1 to explore Researchers who are enhancing the holistic sensorial experience of Architecture.

2.1.4 Researchers: Enhancing the Sensorial Experience

Sensorially aware architects such as Juhani Pallasma,(2005), Peter Zumthor (2006), Joy Monice Malnar and Frank Vodvarka (2004), Barry Blesser and Linda-Ruth Salter (2007), and Anna Barbara and Anthony Perliss (2006) have each identified, to different degrees, the biased nature of architectural design towards the sense of vision.

In the architectural theory text 'The Eyes of the Skin' (Pallasmaa, 2005) Finnish architect, writer and lecturer Professor Juhani Pallasma 'calls for a full understanding of the human condition' (p. 72). He claims: 'The making of architecture calls for clear thinking, but this is a specific embodied mode of thought that takes place through the senses and the body, and through the specific medium of architecture' (p. 46).

He recognised that a holistic sensorial consideration in a making of architecture would aid to dilute the visual dominance that currently exists. He declared that this would result in placing more importance on the other senses which in western culture, he stresses, have been suppressed.

Pallasma draws comparisons of how the senses are utilised in architectural design. He attracts attention to architects who work within a visual dominance as being Le Corbusier and Richard Meyer, whereas he refers to the architecture of Erich Mendelsohn and Hans Scharoun when identifying they favour 'muscular and haptic plasticity' over the sense of vision. He recognises that Frank Lloyd Wright and Alvar Aalto have a 'full recognition of the embodied human condition' (p. 70) and therefore design for human instinct through an unconscious comprehension. Finally he suggests that Glenn Murcutt, Steven Holl and Peter Zumthor are leading the way in designing for a holistic sensorial experience. Pallassma

clarifies that a visual architecture is itself not an issue; instead it is the lack of sensory consideration in architecture which detracts from a complete experience.

In parallel to Pallasma's recognition of a lack of holistic sensorial experience in architecture, Joy Monice Malnar (Architect) and Frank Vodvarka (Professor of Fine Art) in the text 'Sensory Design' (2004), pose an interesting question*:* 'What if we designed for all of our senses? Suppose for a moment that sound, touch, and odour were treated as the equals of sight, and emotion considered as important as cognition' (Preface ix). Within their work, they explored the spectrum of the senses in terms of cognition, but also highlighted that emotion was also an important factor which needed to be considered in the design of buildings.

Written for the designer to explain the processes of perception, Malnar and Vodvarka explore the psychological aspects of design in terms of the plethora of senses and sensation. They suggest that the understanding of 'place' is dependent on two fundamental elements: sensation [which they define as 'the flow of data received through the sense organs'(p. 21)] and perception [which they define as 'the data after it is processed and interpreted' (p. 21)].

In exploring the sense of hearing in 'Spaces Speak, Are You Listening? Experiencing Aural Architecture' (Blesser and Salter, 2007), it is recognised that non-visual qualities of a space can contribute to the experience of using and moving through it. The authors, Dr Barry Blesser and Linda-Ruth Salter claim that every space has an auditory stimulus and we utilise this as we move through a series of spaces.

In uncovering scientific and cultural elements of sounds in spaces, they based their findings in relation to acoustical spaces such as caves and concert halls. In addition to promoting the use of sound in architecture Blesser and Salter maintain that in addition to being able to see spaces, the use of sound is an additional aid in navigation. They also recognise that there is

always an emotional reaction to sound: ‘The acoustics of an open area can produce feelings of either freedom or insecurity’ (p. 2). Blesser and Salter suggest that when building a cognitive map of a space there is always a palate of senses to pick from [regardless of sensory ability].

When considering people who are blind they identified that it was only in the mid-twentieth century that ‘anecdotal accounts of blind persons “seeing space”’ (p. 37), was first accepted as being an auditory skill. However they highlighted that people who are Blind may not specifically use their hearing when navigating space [e.g. if they use a cane they are using tactile cues].

In addition to the detail that acoustic cues can provide in the task of interpreting the surroundings, Blesser and Salter (2007)accepted that acoustics can be used as a tool to provide the user with a means of identifying how the space should be used and that it also contributes to how someone feels or how they connect with, and understand their surroundings.

They identify that people always respond to the acoustics of their surroundings ‘although we may not be consciously aware that aural architecture is itself a sensory stimulus, we react to it’ (p. 2). For example, the sounds emitted from a night-club may entice a young group of people to enter however the same sounds emitted from a restaurant may make an elderly couple or young family to choose a different place to have dinner.

Anna Barbara [Architect] and Anthony Perliss [Graphic Designer for a perfume company], have based their writings around the olfactory sense of smell in the text ‘Invisible Architecture, Experiencing Places through the Sense of Smell’, (2006). Using scent as the

driver in their exploration of the 'invisible architecture' Barbara and Perliss, identified that the sense of smell is not used to its full potential in the design of buildings.

In their studies, they explored the psychological associations and impacts of both pleasant and unpleasant smells and found that smells in a building are often the result of the activities which took place there as opposed to the building and the materials it was made from. With this they ascertain that 'Odour is a vehicle for rendering an experience more enveloping and memorable. It both reinforces the experience and can also make an illusory experience verisimilar' (p. 93).

Two other architects who have investigated the effects of buildings on user's emotional experience are: Christopher Alexander, who in 'A Patterned Language', (Alexander et al., 1977) and 'The Timeless Way of a Building', (Alexander, 1979) explored human emotions and movements by way of the a building's layout, and Francis D.K Ching (1996), who explored how architectural design impacts on the behaviour of the user and found that certain qualities of architectural space have the power to influence the user's movements through the space.

It is evident that the holistic sensorial experience contributes to the experience of using a space (Pallasmaa, 2005;Zumthor, 2006;Malnar and Vodvarka, 2004;Blesser and Salter, 2007;Barbara and Perliss, 2006). These researchers and practitioners provide insight into less visual, more holistically sensorial experience of being in a building.

Questions in relation to understanding Visual Ability/Loss

What is the nature of visual loss?

What are the challenges and impact of visual loss?

How is visual loss understood, defined and categorised?

Questions in relation to understanding Way-finding

What is Way-finding?

How has way-finding been categorised and understood?

Who has described aspects of way-finding that are non-visual or partially visual?

Questions in relation to understanding Current Design Approaches to Assist/Enhance Way-finding

Who has designed products or environments to aid/enhance way-finding within public buildings?

How do these aid way-finding?

How can these way-finding approaches be categorised?

Figure 2.1.10: Questions arising from Review 1 which focus Review 2, 3 and 4

2.1.5 Review Summary

In this first broad-based Review the multi-disciplinary scope of the research field has been mapped and the key researchers have been identified. From this initial scoping of the field, *A Focused Contextual Guide* [figure 2.1.11] has been established and the problem area, based on the two major research themes [[1] Way-finding in a building by [2] people who have varying degrees of visual loss], has been outlined.

The built environment is failing to support people who have a form of visual loss (Barker et al., 1995). The task of way-finding within a public building is raised as a particular problem (Barker et al., 1995;Arthur and Passini, 1992). Architecture based on the needs of people who are completely blind is not beneficial or useful to people who have different and varying range of visual ability [or for the rest of society] (Barker et al., 1995).

User involvement is extremely important to uncover and understand the issues of way-finding and visual loss. In addition to the negative experiences there are also positive experiences. A balanced view of experience needs to be considered.

From this broad Review the Researcher has a series of questions [figure 2.1.10] which need to be answered before this study can progress. These will aid to further establish the research and identify the gap in the current knowledge. As outlined within the *Contextual Guide* [figure 2.1.11], the Researcher has established that there are three focused Reviews which need to be considered:

- Review 2/4: The Nature of Visual Loss
- Review 3/4: The Nature of Way-finding
- Review 4/4: Current Design Approaches to Assist/Enhance Way-finding

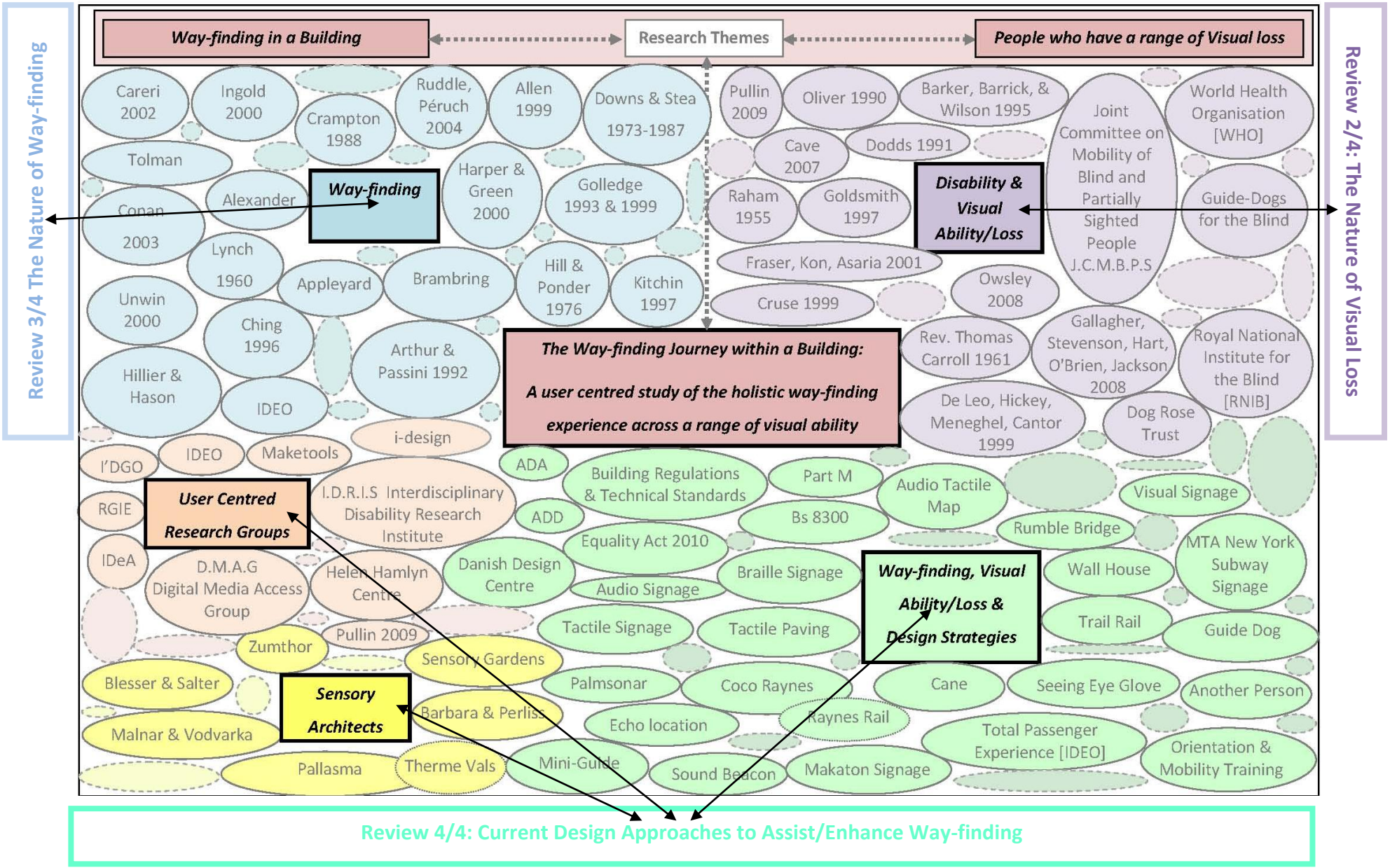


Figure 2.1.11: Contextual Guide

Chapter 2

2.2 Review **2/4**

[A Focused Insight]

The Nature of Visual Loss

‘Blindness [and visual loss] is a private matter

between a person and the eyes with which he or she was born’

(Saramago, 1997,p. 30).

2.2.0 Review Introduction

In a thesis which investigates the way-finding experience of people who have a form of visual loss, it is crucial that the nature of visual loss is understood. Goldsmith (1997) identifies that vision biased professions such as Architecture and Design could especially benefit from empathising with this knowledge.

Visual loss, whether mild or severe, can occur when one or more parts of the eye or brain become diseased or damaged (National Eye Institute, 2010). A breakdown in visual function affects the processing and precision of visual information (Barker et al., 1995).

Locale, sex, age and ethnicity are variables affecting the likelihood of acquiring a visual loss. Inhabitants of developing countries, females, older people (World Health Organization, 2009) and certain ethnic groups (Royal National Institute for the Blind, 2009a;World Health Organization, 2010) are recognised as having increased probability of experiencing a form of visual loss.

The conditions that can cause visual loss are vast in range and type (Barker et al., 1995). Visual loss can develop as result of a condition that a person is born with, or something which is progressively degenerative and is a result of the ageing process. It can transpire due to a hereditary condition passed down through family genetics, or can be the consequence of ill health, disease or an accident (World Health Organization, 2010 ;Barker et al., 1995). In addition to the fact that, 'child blindness remains a significant problem globally' (World Health Organization, 2009,p. 1), the aging population is now one of the leading factors influencing visual loss in both the developing and developed countries (World Health Organization, 2004;World Health Organization, 2009).

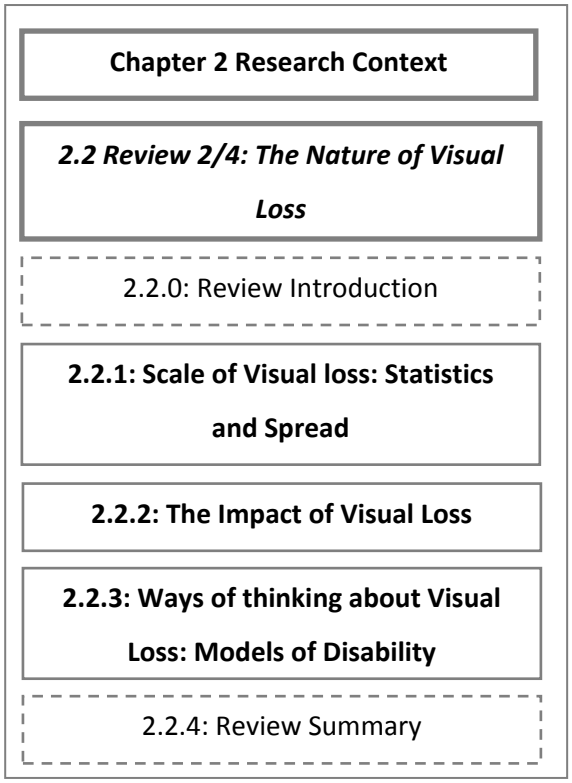


Figure 2.2.0: Review 2 Outline

Within Review 2, outlined in figure 2.2.0, the objective is to gain insight into current literature describing the issues surrounding visual loss.

Section 2.2.1 Scale of Visual loss: Statistics and Spread, depicts the global impact, magnitude and effects of visual loss. 2009 Worldwide, Regional and UK statistics presented by the World Health Organisation [WHO] and the Royal National Institute for Blind People [RNIB] are reviewed.

Section 2.2.2 The Impact of Visual Loss, answers two main questions of the literature: How does someone deal with losing their visual ability? And What is understood of the challenges they face? Six categories of 'losses' in regard to visual loss are also described.

Section 2.2.3 Ways of thinking about visual loss: Models of Disability, discusses the contentious issue of terminology and two main Models of Disability: The Medical Model of Disability and the Social Model of Disability (Oliver, 1990) will be discussed. In relation to Architecture, a third Model of Disability – Goldsmith's (1997) Architectural Model of Disability – is also described.

Section 2.2.4: Review Summary, concludes Review 2 and briefly introduces Review 3/4.

2.2.1 Scale of Visual loss: Statistics and Spread

This section outlines the world-wide extent of visual loss. Although statistics of visual loss are widely under-represented (Campbell, 2004), 2009 data in regard to world-wide statistics (World Health Organization, 2009), regional statistics (World Health Organization, 2004) and UK statistics [where this study is based] (Royal National Institute for the Blind, 2009a) will be examined. In doing so, the scale and extent of visual loss is illustrated.

2009 World-Wide Statistics

In 2009 worldwide statistics presented by WHO estimated that 314 million people had a form of vision loss. Approximations that 45 million people had a form of 'blindness' (World Health Organization, 2009,p. 1) and 269 million people had varying degrees of 'low vision' (World Health Organization, 2009,p. 1), signified that the conditions, characteristics, and impacts of visual loss affected and continue to affect a considerable percentage of the world-wide population.

Visual loss is not an equal occurrence across the world (World Health Organization, 2009). Locale is a major factor impacting on a person's probability of incurring a form of visual loss. Previous to 2009 [and when referencing 2002 data in a 2004 report] WHO divided the world into geographical areas [i.e. African, American, Eastern Mediterranean, European, South-East Asian and the Western Pacific's] in order to investigate the regional extent of visual loss (World Health Organization, 2004). These statistics have been formed into a series of pie charts by the Researcher to illustrate the scale and spread of visual loss [figure 2.2.1].

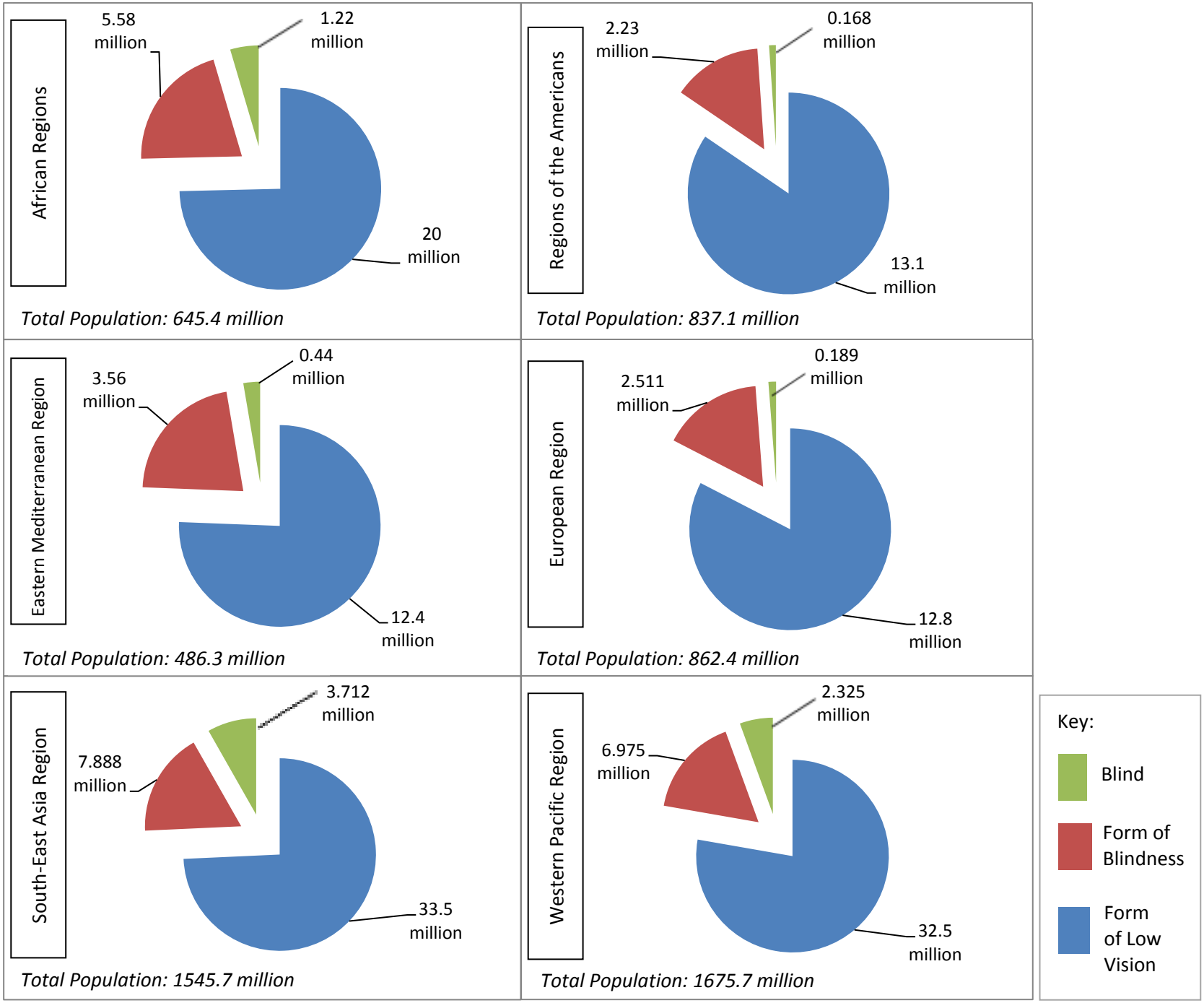


Figure 2.2.1: Scale of Visual loss: Statistics and Spread (World Health Organization, 2004)

U.K. Statistics

'Everyday in the UK, another 100 people start to lose their sight'

(Royal National Institute for the Blind, 2009b).

Concentrating in the UK [where this study is based] 2009 statistics put forward by Royal National Institute for the Blind [RNIB] reported that two million people had a degree of visual loss in the UK (Royal National Institute for the Blind, 2009a).

RNIB's breakdown of the 2009 data approximated that 365,000 people were registered blind or partially sighted. However, on top of this, it was estimated that a further 73,000 people were entitled to register but were not (Royal National Institute for the Blind, 2009a). This was thought to be the result of the voluntary nature of the individual seeking out the testing and registration of their vision (Fraser. S et al., 2001).

Subsequently, this breakdown approximated that 1,635,000 people in the UK in 2009 had a form of visual loss which was either not registered [when it could be] or was not eligible for registration under current diagnosis (Royal National Institute for the Blind, 2009a).

In the UK, a considerable amount of people live with a form of visual loss without any external forms of support. RNIB have identified that the number of people with visual loss is increasing (Royal National Institute for the Blind, 2010). They state: 'Sight loss is one of the commonest causes of disability in the UK' (Royal National Institute for the Blind, 2009a,p. 3).

With visual loss impacting on approximately 314 million people in 2009 (World Health Organization, 2009,p. 1), the global extent of visual loss is obviously a hugely important issue which needs to be fully understood. However this task is made difficult as terminology and classification used often varies across sources.

2.2.2 The Impact of Visual Loss

'Losing your sight is a crushing experience and there is no magic wand that can restore the joys and riches of seeing. Nevertheless, [...] there is life after sight loss.'

(Kaye and Royal National Institute for the Blind, 2009,p. 5)

Not all forms of visual loss can be corrected (World Health Organization, 2010a). People who have a form of visual loss [diagnosed or not] have to adapt to all aspects of life by operating with varying degrees of visual information about their surroundings (Barker et al., 1995). Their family, friends and work colleagues also have to adapt (Mogk and Mogk, 2004;Kaye and Royal National Institute for the Blind, 2009). The human variables, of age and when the visual loss occurred, influences a person's experience of *impact* (Stedman and RNIB Emotional Support Service, 2009).

An increasing amount of research within the field of psychology has concentrated on the psychological challenges and impacts of a loss of visual ability (De Leo et al., 1999;Stedman and RNIB Emotional Support Service, 2009). However, compared with the amount of research found regarding the psychological aspects of losing vision in later life, a considerable lack of research exploring the psychological and functional impact of people who have been blind since birth has been found by this Researcher. This is also true, to an extent, regarding loss of visual ability in teenagers, working and middle-aged people.

To understand the impact of visual loss a broad spectrum of literature was investigated.

How does someone deal with losing their sight?

The reason as to how the person's loss of visual ability has come about [e.g. due to a medical issue or due to an accident] has been recognised as impacting on how they originally deal with the loss (Cruse, 1999). People who were diagnosed as completely blind were found to come to terms and adapt with their loss of sight in a more positive way than those diagnosed with a degree of visual loss which had a chance of being corrected (De Leo et al., 1999).

Generally, when visual loss comes about, there are three overall psychological reactions to the loss. These are: 1. accepting and dealing with visual loss; 2. denying and refusing to accept that there is visual loss; and 3. depression and anxiety as a result of the loss (Adams and Pearlman, 1970).

Acceptance is considered an ideal outcome while denial is thought to be a transitory reaction which is deemed to be a step in the right direction in dealing with the loss (Adams and Pearlman, 1970). The third reaction, depression, is contested amongst researchers in terms of 1. why depression occurs, and 2. whether depression is a positive or negative psychological reaction (Mogk and Mogk, 2004;Abolfotouh and Telmesani, 1993;De Leo et al., 1999).

When considering *why depression occurs*, Lylas (2004), identified that it was regardless of 'age, sex, marital status, living situation, or degree of vision loss itself'(p. 5). Instead, it was a reaction which was associated with 'functional capacity' which he explained as being, 'If you can still do the things you want to do, you are far less likely to become depressed'(p. 5).

In other studies, depression is identified as a more common occurrence in people with the impairment of severe visual loss ['Blindness'] when compared to people with the impairment of severe hearing loss ['Deafness'] (Abolfotouh and Telmesani, 1993). Depression is also

recognised as being more prevalent in people with visual loss than other medical ailments (Mogk and Mogk, 2004).

De Leo et al. (1999), [when referencing Shulz] also identified that family members play an important role in a person's psychological adjustment to vision loss. They too can experience reactions of accepting or denying that their son, father, daughter, mother, etc. has a visual loss.

When debating whether depression is a positive or negative psychological reaction, Adams and Pearlman (1970) imply that depression is a negative reaction to visual loss and state that a form of counselling is a recommended form of treatment to alleviate symptoms (Adams and Pearlman, 1970). However, in contrast, it is acknowledged that an initial short-term period of depression was found to be a common and mentally healthy response (Rahman, 1955;Kaye and Royal National Institute for the Blind, 2009). It is thought that the person goes through a through a 'grieving' process (Rahman, 1955;Kaye and Royal National Institute for the Blind, 2009;Carroll, 1961). As Carroll (1961) suggests, the once visually able person is, in effect, dealing with the 'death' of their visual ability.

People who have been born with a visual loss do not [generally] have similar emotional experiences to someone who loses visual ability with age [owing to their lack of sight being the only experience they know] (Stedman and RNIB Emotional Support Service, 2009).

What is understood of the challenges someone with visual loss faces?

The impact of visual loss is that the person can experience losing a sense of control over all aspects of their life (Dodds, 1991). The experience and bearing of visual loss differs widely amongst individuals (Owsley, 2008;Royal National Institute for the Blind, 2009a). Although the challenges and impacts experienced with visual loss are difficult to categorise in a general way (Royal National Institute for the Blind, 2009a), attempts have been made to do so (Carroll, 1961;Stedman and RNIB Emotional Support Service, 2009). It is vital to understand that not all people with visual loss will experience these impacts, they also of course, may encounter other challenges which are not covered in this Review.

In 1961, the Reverend Thomas Carroll identified twenty losses which affect a person who loses visual ability. He divided the losses into several categories: 1. losses of psychological security, 2. losses of basic skills, 3. losses in communication, 4. losses in appreciation, 5. losses concerning occupation and recreation, and 6. losses affecting the personality (Carroll, 1961).

This is a much referenced list and although it is the most succinct account of 'losses' that the researcher has come across - it is fifty years old. Disability research and the ways of thinking about disability and impairment have advanced greatly since this work. Therefore, although this list will structure this section, other more up to date sources of literature are also drawn upon to describe the 'losses' someone with visual loss potentially faces. Each of these 'losses', which also impact and influence each other, will now be considered.

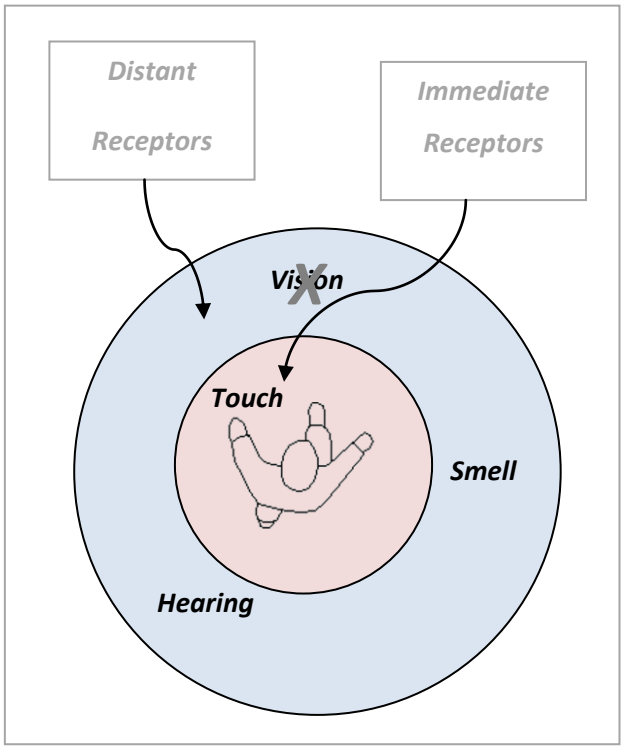


Figure 2.2.2: 'Man's sensory receptors' (Hall, 1966)

1. Psychological Security

Losses in Psychological Security include: [a] loss of physical integrity, [b] loss of confidence in the remaining senses, [c] loss of reality contact with the environment, [d] loss of visual background and [e] loss of light security (Carroll, 1961).

[a] loss of physical integrity

A person experiencing visual loss potentially encounters a range of different and varying emotions such as: shock, denial, anger, questioning, helplessness, fear, anxiety, sadness, grief, depression, visual hallucinations [most likely to occur when there is sudden sight-loss], loss of identity and renewal of identity (Stedman and RNIB Emotional Support Service, 2009).

Physical integrity is often dependant on how the person feels they are perceived by other people. It is identified that as a sighted person, the person who now has visual loss may have had negative perceptions and 'inaccurate and stigmatising ideas of what it means to have a disability' (Stedman and RNIB Emotional Support Service, 2009). They then transfer these ideas onto themselves. Carroll (1961) identifies that this can often make them feel different - an 'outsider' to a society which they were once, as a sighted person, part of.

[b] loss of confidence in the remaining senses

The environment is encountered, experienced and understood by way of all of the senses however there is a visual dominance (Pallasmaa, 2005;Blesser and Salter, 2007). As illustrated in figure 2.2.2, Hall (1966) classifies 'Man's sensory receptors' as being comprised of the distance receptors, those concerned with examination of distant objects: the eyes, the ears and the nose and the immediate receptors: those used to examine the world close up: touch. A person with visual loss lives with a complete or partial lack of one of their distant receptors.

Loss of such a dominant sense means that the person must learn to use and trust their other senses to obtain the information sight once provided (Bernsen, 1996). There is no magical sensory response when sight is taken away. The other senses do not become 'stronger' but the way in which they operate become more efficient (Carroll, 1961;Bernsen, 1996).

In using the senses to interpret a building Bernsen (1996) states: '[...] a blind person may improve their ability to utilise other sensory input. [...] some visually impaired people are able to detect obstacles or perceive the size and layout of a room through the sound bouncing off walls or objects'(p. 17). Blesser and Salter (2007) support this claim.

[c] loss of reality contact with the environment and [d] loss of visual background

A loss of visual background determines that the person has to adjust to having a lesser degree of contact with their surroundings [a loss of holistic reality contact]. Instead they have to utilise the partial, incomplete and sometimes disjointed information from the other sensory sources of touch, sound, smell and kinaesthetics (Edwards et al., 1998;Mettler, 1987;Hall, 1966).

[e] loss of light security

Loss of visual ability does not always mean living in a state of darkness (Barker et al., 1995). Although there is a degree of loss of light security, the vast majority of people who are blind have some degree of residual vision, and many can perceive light and colour contrast (Carroll, 1961;Royal National Institute for the Blind, 2009a).

2. Basic Skills

Losses in Basic Skills include: [f] loss of mobility and [g] loss of techniques of daily living (Carroll, 1961).

[f] loss of mobility

Loss of visual ability impacts on independence in ability to move through ones surroundings (Barker et al., 1995). Carroll suggests that because of a lack of freedom, security, and control, people with visual loss may become very dependent on others (Carroll, 1961;Stedman and RNIB Emotional Support Service, 2009;De Leo et al., 1999).

The loss of mobility is of particular interest to this study exploring way-finding. Mobility is one of the biggest challenges associated with a visual loss (Abolfotouh and Telmesani, 1993). This is particularly evident in those who lose vision later in life (Licina et al., 2008;Gallagher et al., 2008). Older people who have visual loss sometimes avoid being actively mobile due to a fear of accidents (Gallagher et al., 2008). Rehabilitation, such as Orientation and Mobility training, and the use of aids such as a cane, guide-dog etc. can help mitigate the loss of mobility. The amount of rehabilitation needed is dependent on the person (Mogk and Mogk, 2004).

Barker et al.'s (1995) method of understanding and translating visual loss [through a series of visual simulations] provides an overview of the general eye function and mobility challenges associated with visual loss and mobility within the domain of the external environment.

Using an image of the built environment [figure 2.2.3], the visual loss conditions of Cataract's, Macular Degeneration, Tunnel Vision and Diabetic Retinopathy were separately simulated on top of Normal Sight. These visual representations are based on description and are only intended to give a general visual synopsis of the conditions that they exemplify.

Figure 2.2.3: Normal Sight

Images sourced from: (Barker et al., 1995,p. 25)

The scene in figure 2.2.3 depicts the state of Normal Sight. The person can see their surroundings to navigate and orientate safely and knowingly. In comparison, the scene depicted in figure 2.2.4 simulates what can be seen with having the impairment caused by Cataracts. The vision becomes blurred and there is missing information that could be crucial in accessing the directional information that informs travel. 'The scene begins to blur, some key features begin to merge and the detail is drastically reduced; signs would be difficult to read' (Barker et al., 1995,p. 25).

The scene depicted in figure 2.2.5 simulates what can be seen with having the condition of having Macular Degeneration. Although peripheral information is available, there is no central vision. 'No central vision makes way-finding extremely difficult even through peripheral vision remains. Signs would be impossible to read' (Barker et al., 1995,p. 25).

The scene depicted in figure 2.2.6 simulates the condition of Tunnel Vision. Although the person has central vision, they have little awareness of their peripheral vision. 'A very small part of the scene is visible giving no warning of hazards and making progress very slow' (Barker et al., 1995,p. 25).

Finally, the scene depicted in figure 2.2.7 simulates the condition of Diabetic Retinopathy. The visual information is very confused with erratic and inconsistent portions missing. 'Patchy vision results in lack of sharpness across the visual field; the scene merges together making it almost impossible to see which way to travel' (Barker et al., 1995,p. 25).

Figure 2.2.4: Cataracts

Figure 2.2.5: Macular Degeneration

Figure 2.2.6: Tunnel Vision

Figure 2.2.7: Diabetic Retinopathy

Images sourced from: (Barker et al., 1995,p. 25)

[g] loss of techniques of daily living

A visual loss [of any degree] in an adult who previously had complete visual ability has been identified as compromising functional ability more than any other single physical impairment (Mogk and Mogk, 2004).

Quality Of Life Questionnaires [QOL] are often used in research studies to measure the impacts of visual loss (Dickinson and Hermandez, 2008). They provide information relating to adaption to the new decreased visual ability, particularly in terms of taking part in daily functional responsibilities, errands and demands (Dickinson and Hermandez, 2008). This data does tend to be general in nature and detail about the actual conditional experience of visual loss is often missed (Hinds et al., 2003). There is lack of an equivalent method to measure peoples' adjustment to a more severe form of visual loss (Tolman et al., 2005).

Family members can impact on the degree of loss in relation to techniques of daily living. They may become overprotective and this is thought to negatively impact on the individual's psychological adjustment and rehabilitation. It has been identified that decreased levels of independence in someone with visual loss is connected with 'depression' and 'regression' (De Leo et al., 1999).

The support system in place and the rehabilitation available affects a person's 'functional capacity' (Mogk and Mogk, 2004), positive rehabilitation encourages independence. Training in living-skills such as mobility, cooking and coping with visual loss are provided by sight loss charities and can have a positive impact on a person's life (Royal National Institute for the Blind, 2010 -a).

3. Communication

Losses in Communication include: [h] loss of ease of written communication, [i] loss of ease of spoken communication and [j] loss of informational progress (Carroll, 1961).

[h] loss of ease of written communication

Depending on the degree of visual loss, individuals lose the ease at which they can read and write. RNIB suggest that making text bigger, brighter and bolder can aid a person who has residual vision (Royal National Institute for the Blind, 2011). There are other sources of communication formats available and commonly used formats include, large print [font size 16+], Braille and Audio (Royal National Institute for the Blind, 2006).

[i] loss of ease of spoken communication

The ability to read body language and facial expressions are an important aspect of spoken communication which is lessened because of visual loss. It becomes more difficult to interpret conversations (Carroll, 1961). A person with visual loss may miss non-verbal communication prompts such as: repetition [e.g. body language can repeat or emphasise something which is being said], contradiction [e.g. body language can convey a different message from what is being said], substitution [e.g. body language can convey something which is not being said], complementing [e.g. body language can add to something which is being said through a smile or a frown], and accenting [e.g. body language can make more of what is being said through hand gestures](Knapp and Hall, 2001).

[j] loss of informational progress

Combined, the: [h] loss of ease of written communication and [i] loss of ease of spoken communication can make it more difficult for the person with visual loss to remain socially connected (Carroll, 1961;Royal National Institute for the Blind, 2006).

4. Appreciation and Enjoyment of Beauty

Losses in Appreciation and Enjoyment of Beauty include: [k] loss of visual perception of the pleasurable and [l] loss of visual perception of the beautiful. Loss of vision means losing the ability to visually access objects found once to be visually pleasing (Carroll, 1961).

5. Occupational and Financial Status

Losses in Occupational and Financial Status include: [m] loss of recreation, [n] career development and [o] loss of financial security (Carroll, 1961).

[m] loss of recreation

The person may have to re-think their hobbies and forms of recreation in regard to their visual ability. For instance, they may have to give-up reading books or driving (Kaye and Royal National Institute for the Blind, 2009;Carroll, 1961).

[n] career development and [o] loss of financial security

Visual loss impacts on aspects of working life through challenging confidence which is especially evident in older people(Kaye and Royal National Institute for the Blind, 2009). It can also result in a career change or a period of re-training which may result in a loss of financial security.

6. Personality

Losses in regard to Personality include: [p] loss of personal independence, [q] loss of social adequacy, [r] obscurity, [s] loss of esteem, and [t] loss of total personality organisation (Carroll, 1961).

[p] loss of personal independence

Visual loss impacts on aspects of psychological life such as personality (Kaye and Royal National Institute for the Blind, 2009) and independence (Licina et al., 2008;De Leo et al., 1999). Loss of visual ability impacts on family relationships and everyday roles and responsibilities become altered (Mogk and Mogk, 2004).

[q] loss of social adequacy and [r] obscurity

The person with visual loss loses the anonymity they once had (Carroll, 1961). They may experience the feeling of always being noticed by others because of their condition [e.g. they become the blind person with the cane or the guide-dog]. A feeling of social inadequacy may be the result (Carroll, 1961).

[s] loss of esteem

Carroll identifies two types of self-esteem: 1. the objective, which is based on personal accomplishments and successes and 2. the subjective, which is based on how the person feels about themselves and their [a] Physical Integrity.

Psychological aspects of self-esteem, independence, isolation and confidence, were found to be dependent on the variables of age, sex and degree of visual loss. In a study investigating aspects of self-esteem in children of primary and secondary ages in the UK, it was found that a group of females who had a visual loss had more self-esteem than a similar group of males (Bowen, 2010). The degree of visual loss [mild or severe] and how much visual ability is left is also thought to have an impact on a person's self-esteem (Bowen, 2010). In younger age groups [regardless of gender] loneliness was identified as an emotional impact of visual loss (Kaye and Royal National Institute for the Blind, 2009).

Carroll highlights (1961) that: [p] loss of personal independence, [q] loss of social adequacy, [r] obscurity, and [s] loss of esteem, can lead to a complete change in someone's personality. He explains that there is a significant shock to the system.

[t] loss of total personality organisation

When investigating adult vision loss, Lylas (2004) stated, 'To lose vision as an adult is therefore to experience one of your worst fears' (p. 3). Raham (1955) explained that this was because the person with visual loss had to come to terms with being a person who can no longer see. The whole personality changes and recognition of this adaption was one of the first steps in learning to deal with the new circumstance (Rahman, 1955;Mogk and Mogk, 2004;Carroll, 1961).

Although not all people who have a loss of visual ability will experience all of these impacts, and there may be many more that they do encounter, a picture has been gathered in exploring the nature of a loss of visual ability in terms of functional and psychological aspects.

The next section will consider the current ways of thinking about disability in regard to visual loss: The Medical Model of Disability, the Social Model of Disability and the Architectural Model of Disability.

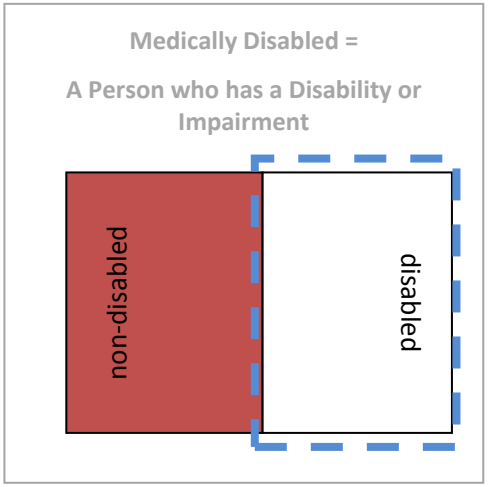


Figure 2.2.8: The Medical Model of Disability/01

2.2.3 Ways of thinking about Visual loss

On a broader scale, there are two main [opposing] paradigms of considering forms of disability and impairment – under the Medical Model of Disability (Fraser. S et al., 2001) and under the Social Model of Disability (Oliver, 1990). Within the discipline of architecture, Goldsmith recognised and coined another – the Architectural Model of Disability (Goldsmith, 1997). This section will now outline the characteristics of each model.

The Medical Model of Disability: Definition of Visual Loss

Within the Medical Model of Disability the person is seen by society as having a medical condition, disability or impairment and is in need of a form of medical treatment or cure. In this view, the medical condition or disability is said to be seen first and the person is second to this. For example: *He is the man who is blind* or *She is the girl who is deaf*. The Medical Model of Disability defines that if someone has impairment then they are disabled [figure 2.2.8].

This model sees disability as a 'personal tragedy' (Oliver, 1990). The focus is on the condition or impairment and not the person. The method for bringing about change for the disabled, blind or deaf person is seen to lie within the medical professions. The task of understanding, to then explain and relate Medical Model terminology and categorisations of visual loss to the context of architecture and design has been found to be an extremely challenging task.

The condition of visual loss is extremely complex and encompasses a broad spectrum of loss of visual function (Barker et al., 1995). It is in no way as clearly defined as everyday terminology often suggests. For example, *he is blind* often implies that there is no visual ability, however, RNIB explained that 'being blind does not always mean living in total darkness' (Royal National Institute for the Blind, 2009a,p. 5).

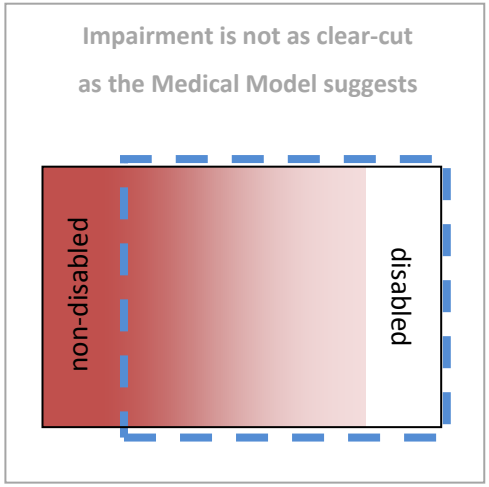


Figure 2.2.9: The Medical Model of Disability/02

Impairment is not as clear-cut as the Medical Model suggests. Most people with impairment tend to be in the middle range [figure 2.2.9]. For example, in the UK, 5 percent of the 2million people who are registered with visual loss are blind (Barker et al., 1995) with only 4 percent of these people not being able to detect light and dark. This means that 96% of people who are categorised as being Blind have some residual vision (Barker et al., 1995;Royal National Institute for the Blind, 2009a).

The use of terminology associated with visual loss is a contentious issue. Definitions and terms used amongst [and within] professional bodies such as RNIB and WHO vary. For example RNIB define 'Registered Blind' and 'Registered Partially Sighted' in the text 'Building Sight: a handbook of building and interior design solutions to include the needs of visually impaired people' (Barker et al., 1995); however, they frequently use terms such as 'Partially Sighted' and 'Blindness' on their website (Royal National Institute for the Blind, 2010 -a).

In order to explore definitions and meaning of visual loss within the Medical Model of Disability, this section will begin with a synopsis of the medical diagnosis of visual loss before investigating terminology used to define visual loss. It is important to have an understanding of the diagnosis to then understand the origin of terminology used by medical professions. Although presenting some of the general categorisations of visual loss, this section will not go into specific detail of all conditions as this is not relevant to this study.

Figure 2.2.10: Snellen Chart

The Snellen Chart is often mounted on the wall and is made up of letters which from top to bottom decrease in size (Fraser. S et al., 2001,p. 24).

Medical Diagnosis: Testing of visual loss

'Being diagnosed as having a sight problem or believing that this may be the case, can be an anxious time. Feelings of worry and uncertainty about the future can be hard to cope with' (Royal National Institute for the Blind, 2010 -a).

In addition to investigating a patient's history [e.g. ophthalmic, medical, drug, family, and social histories (Fraser. S et al., 2001)], Ophthalmologists measure visual function (Royal National Institute for the Blind, 2009a,p. 3) through assessing *'*visual acuity colour vision*,* visual field, ocular movements*,* pupil reactions, the external eye and the optic disc and retina' (Fraser. S et al., 2001,p. 23).

Visual acuity and visual field will be the elements explored in further detail in this section as they impact on terminology used within the medical definitions of visual loss.

Visual Acuity

'The clarity or clearness of the vision, a measure of how well a person sees. The ability to distinguish details and shapes [...] also called central vision' (MedicineNet Inc, 1999).

Visual acuity is generally assessed using a Snellen Chart [figure 2.2.10]. The degree of visual ability is measured as a calculation made up of the distance the patient is standing from the chart divided by the size of the smallest letter that can be read (Fraser. S et al., 2001). In defining 'good vision', Scott Fraser et al. (2001) state the measurement of 6/6 is ideal in the UK [20/20 is the equivalent in America].

Visual Field

Barker et al. (1995) define the visual field as 'everything that can be seen at a glance; when looking directly at an object, as well as other items sited beyond it' (p. 22). The visual field is generally assessed by testing what can be seen in the peripheral area of the eye. One eye is covered while the other is focused on a central point that lies straight ahead. The patient must work to either acknowledge the number of fingers the ophthalmologist is holding up, or by indicating when they are able to see a moving implement such as a white tip or a flashing light (Fraser. S et al., 2001).

Medical Categorisation of Visual loss

Under the framework of the Medical Model of Disability, terminology used by the World Health Organisation [WHO] and Royal National Institute for the Blind [RNIB] to define and categorise visual loss will be investigated. There are many other bodies and organisations who have defined visual loss terminology however, with WHO being a world-wide body and RNIB being the leading UK sight loss charity, these two bodies have had most impact on this review.

In general, WHO categorise visual ability in four ways: 'Normal vision', 'Moderate visual impairment', 'Severe visual impairment', and 'Blindness' (World Health Organization, 2010). However, they combine moderate visual impairment and severe visual impairment under an overarching categorisation of low vision. In doing this they claim: 'low vision taken together with blindness represents all visual impairment' (World Health Organization, 2009).

In comparison to WHO, RNIB recommend that visual loss should be categorised in two, more general ways: 'Loss of sharpness across the visual field' (Barker et al., 1995,p. 22) which they

describe as a condition where visual field becomes less clear and precise creating a more blurred and undefined image; and 'Areas of non-vision' (Barker et al., 1995,p. 22), which they describe as a condition where parts of the person's vision is completely taken away. They also claim that the distinction is not always clear and that there are often crossovers between the two. This is because it is difficult to fully categorise visual loss as 'the nature of visual handicap varies considerably between individuals' (Barker et al., 1995,p. 21).

When generally describing aspects of visual loss, RNIB state, 'the result of different eye conditions will lead to [...]: a limited field of vision, being unable to see the sides or up and down; [...] loss of central vision [...] short-sightedness, seeing the world as a continuous blur; uncontrollable oscillations of the eyeball, [...] night blindness, a sensitivity to light and a tendency to be dazzled by glare' (Barker et al., 1995,p. 21).

Blindness and Blind

In defining 'blindness' WHO state: 'Blindness is the inability to see' (World Health Organization, 2010a). Already there is an issue, although WHO imply that nothing at all can be seen, RNIB found that [based on statistical evidence in the UK] that even when someone is blind they may still have some residual vision and an ability to sense light (Royal National Institute for the Blind, 2009a). Under WHO's definition of Blindness, there is no distinction between those who have no light detection and those who do.

In RNIB's definition, they use the Snellen chart as a way of deciding if someone is 'Blind', however again, degree or ability of light perception is not considered as part of the measurement or as part of the definition.

In defining 'blind' RNIB state: 'to be registered as severely sight impaired (blind), your sight has to fall into one of the following categories, [while wearing any glasses or contact lenses

that you may need]: visual acuity of less than 3 / 60 with a full visual field, visual acuity between 3 / 60 and 6 / 60 with a severe reduction of field of vision, such as tunnel vision, visual acuity of 6 / 60 or above but with a very reduced field of vision, especially if a lot of sight is missing in the lower part of the field' (Royal National Institute for the Blind, 2010 -b).

Low Vision and Partially Sighted

When defining 'Low Vision', WHO state: 'Low vision is visual acuity less than 6/18 and equal to or better than 3/60 in the better eye with best correction. A person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception, or a visual field of less than 10 degree from the point of fixation, but who uses, or is potentially able to use, vision for planning and/or execution of a task' (World Health Organization, 2010b).

Whereas when defining 'sight impaired' or 'partially sighted' RNIB state: 'To be registered as sight impaired (partially sighted) your sight has to fall into one of the following categories, while wearing any glasses or contact lenses that you may need: visual acuity of 3 / 60 to 6 / 60 with a full field of vision, visual acuity of up to 6 / 24 with a moderate reduction of field of vision or with a central part of vision that is cloudy or blurry, visual acuity of up to 6 / 18 if a large part of your field of vision, for example a whole half of your vision, is missing or a lot of your peripheral vision is missing' (Royal National Institute for the Blind, 2010 -b).

Under the framework of the Medical Model of Disability, terminology used to define visual loss is concentrated on the medical condition. This means that the person with the impairment is always disabled by their condition. The method of change or solution lies within the domain of the medical profession. The definitions put forward by WHO and RNIB are technical and medical and therefore give no real insight into the experiences of visual

loss. These details, definitions and categorisations do not transfer into an architectural/design context. To exemplify this and in relating the Medical Model of Disability to the themes of this thesis - way-finding by someone with visual loss - it can be identified that if a person, with visual loss is not able to find their way to the toilets in a building – it is the visual loss which is disabling them. The solution under this model is that a medical professional provide treatment or a cure to remedy the visual loss.

The Social Model of Disability: Definition of Visual Loss

The Social Model of Disability is an opposing reaction to the Medical Model of Disability. Under the paradigm of the Social Model of Disability 'People are […] disabled by the society they live in, not directly by their impairment' (Pullin, 2009,p. 2).

Advanced by academics and campaigners, as opposed to the medical professions, the Social Model of Disability is based on the fundamental concept that it is the conditions of society which disables someone. This view concentrates on the person as a valued member of society and disability is an issue of society, not an individual's problem. Under this model, disability is seen as the common oppression brought about by the non-disabled society. Society inflicts the term and connotations of disablement onto the person.

As opposed to calling attention to a medical condition [which the Medical Model does], it is more person centred and based on their experience within society. Under the Social Model, the disablement occurs when someone is excluded from doing something which they could otherwise do if they were not being impaired by the societal constraints (Goldsmith, 1997;Pullin, 2009;Oliver, 1990).

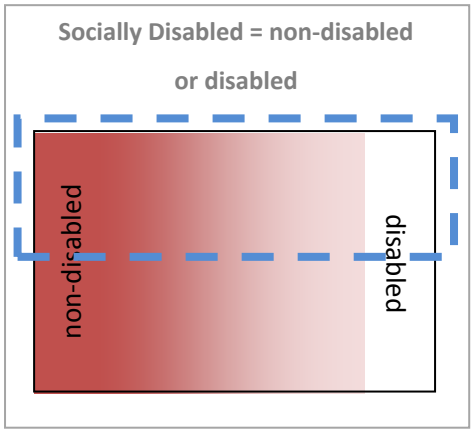


Figure 2.2.11: The Social Model of Disability

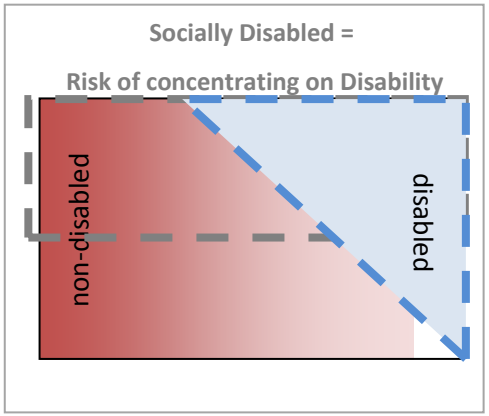


Figure 2.2.12: Goldsmith's (1997)View of the Social Model of Disability

The Medical Model categorises and tests degrees of visual loss and function, however there is no testing or categorisation of the person under the framework of the Social Model of Disability. Under this model it is possible that impairment does not necessarily lead to disability. Both non-disabled people and impaired people may be socially disabled [figure 2.2.11]. A person with impairment may never experience a form of disablement; they may always feel supported by society and the environment that surrounds them. As opposed to reliance on the medical profession for a cure or treatment, the Social Model solution is that attitudes within society need to be changed. To exemplify this and in relating the Social Model of Disability to the themes of this thesis - way-finding by someone with visual loss - it can be identified that if a person with a visual loss is not able to find their way to the toilets in a building – it is the societal constraints which are causing the disablement. The building is the construct of the society. The solution is to change attitudes of society.

In comparison to the medical model, the social model aims to address the problems of impairing societies through removing barriers of disablement [both in terms of physicality and attitude]. The social model is less precise and more subjective than the medical model.

The Architectural Model of Disability

Within the domain of Architecture, Goldsmith developed the Architectural Model of Disability (1997). In evaluating the characteristics of the Social Model of Disability and the Medical Model of Disability, Goldsmith (1997,p. 150) argues that a 'false interpretation' of the Social Model has been created due to it being 'habitually applied […] to people with medical impairments'. This is obviously wrong and goes against the fundamental concept of the Social Model of Disability as it highlights that only people with impairment are disabled by society [figure 2.2.12].

This is not the case. He recognised that the Medical and Social Models are two distinct concepts which cannot, and should not be interchanged.

The whole point of the social model is that it refrains from acknowledging if a person has impairment. This, Goldsmith (1997) states, calls for a new agenda to clearly define and explore the distinguishing features of both the medical and social model. Clarity needs to be given. Hence he has built a case for his concept, the Architectural Model of Disability.

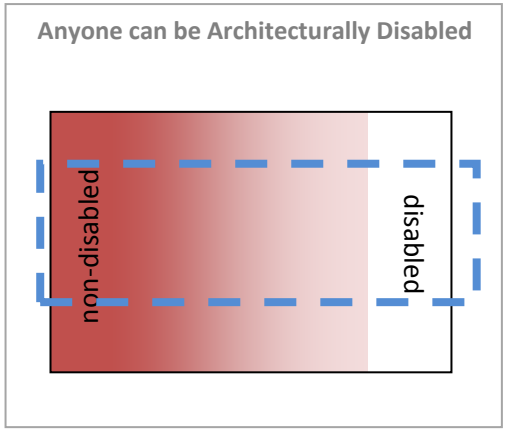


Figure 2.2.13: The Architectural Model of Disability

Goldsmith highlights that all users of an architectural setting can experience a vulnerability to Architectural Disability, regardless of ability or impairment [figure 2.2.13]. In his clarification of this view he states that Architectural disability is a form of disablement which is not due to the person or a medical impairment or disability they may have but instead is a disablement which is presented by an encounter of architecture. An occurrence which he clearly points out is not just experienced by an 'exclusive', 'a discrete' or medically disabled' population, but has the potential to disable anyone and everyone who comes across it (Goldsmith, 1997,p. 151).

He acknowledges that, 'There is not a straight correlation between medical disability and architectural disability; there are medically disabled people who are no more vulnerable to architectural disability than normal able bodied people are' (Goldsmith, 1997,p. 151). Similarly, non-disabled people are no more vulnerable to architectural disability than medically disabled people are.

To exemplify this and in relating the social model to the themes of this thesis - way-finding by someone with visual loss - it can be identified that if a person, regardless of visual ability, is not able to find their way to the toilets – the Architecture is disabling the person. The solution is to change the Architecture.

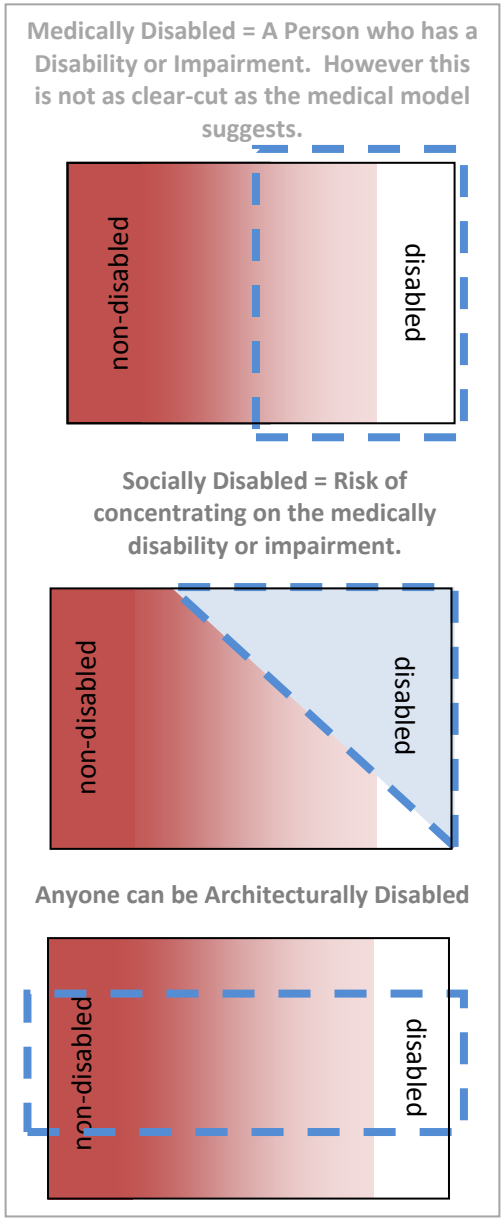


Figure 2.2.14: Summarising the Models of Disability

2.2.4 Review Summary

Review 2 has concentrated on portraying the nature of visual loss. The global extent of visual loss makes it a highly relevant condition which needs to be understood. As opposed to being completely blind, various degrees of visual loss impact on a significant number of people. However, the contentious issue of terminology and definition make understanding this range of visual loss difficult.

Within this section and in relation to the Research Themes, three Models of Disability – the Medical Model (Barker et al., 1995), the Social Model (Oliver, 1990) and the Architectural Model (Goldsmith, 1997) have been explained. The current ways in which disability [as a whole] and visual loss [as the specific] is understood have been explored. Each model is summarised together in figure 2.2.14.

Under the Medical Model of Disability, people who have impairment are disabled. Under the Social Model of Disability either able-bodied or impaired people can be socially disabled [although researchers do tend to concentrate their efforts on the non-disabled population (Goldsmith, 1997)]. Under the Architectural Model of Disability people [regardless of ability or impairment] can be architecturally disabled.

The next Review, Review 3/4, will explore the Nature of Way-finding.

Chapter 2

2.3 Review **3/4**

[A Focused Insight]

The Nature of Way-finding

‘Way-finding design is based on a good

understanding of the way-finding process’

(Arthur and Passini, 1992,p. 26).

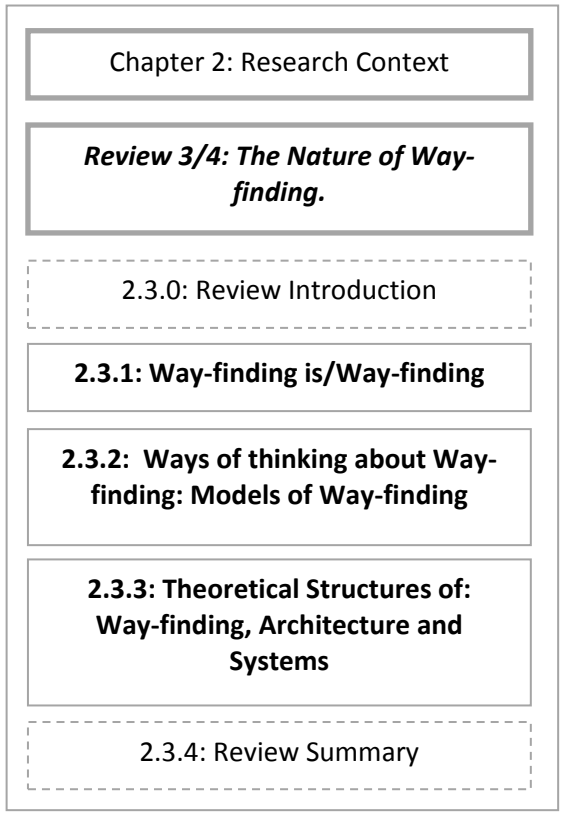


Figure 2.3.0: Review 3 Outline

2.3.0 Review Introduction

Review 3, outlined in figure 2.3.0, will provide an understanding of the concept, nature and processes of way-finding. It will focus on a body of literature concerned with human way-finding in the built environment.

Section 2.3.1: Way-finding is/Way-finding isn't, explores existing empirical research in relation to way-finding. An overview of the nature of way-finding will be presented. This will include clarification of terminology associated with way-finding including: orientation, navigation and cognitive maps. A question is answered: *What is Way-finding?*

Section 2.3.2: Ways of thinking about Way-finding: Models of Way-finding, investigates current ways of understanding the processes of way-finding, both generally and in relation to visual loss. Five models are the focus of this section: Cognitive Mapping Model (Downs and Stea, 1977), Skill Model (Ingold, 2000), Information Processing Model (Arthur and Passini, 1992), Process of Locomotion Model (Hersh and Johnson, 2008,p. 172), and the Travel Task Framework (Harper and Green, 2000).

Section 2.3.3: Theoretical Structures of: Way-finding, Architecture and Systems, presents seven theoretical structures of: Way-finding, Architecture, and Network Analysis.

Section 2.2.4 Review Summary summarises Review 3 and briefly introduces Review 4/4.

2.3.1 Way-finding is...

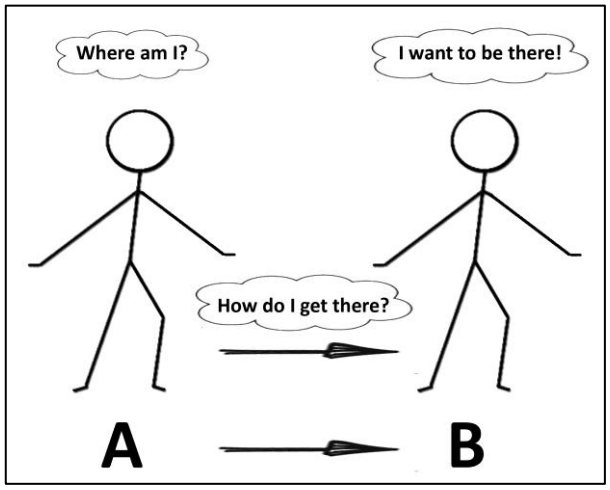


Figure 2.3.1: Way-finding Is...

'Way-finding is user orientated and derives its approach and its interventions from the behavioural and psychological foundations of way-finding' (Arthur and Passini, 1992,p. 42).

The term, *Way-finding* was coined in the 1960's by Architect and Urban Designer Lynch (1960). It is best defined as 'the process of determining and following a path or route between an origin and a destination' (Golledge, 1999b,p. 6).

When traced through evolution, way-finding was recognised as a skill which ensured humanity's continued existence (Careri, 2002). It was essential that the human race developed both proficiency and methods to make way-finding possible (Golledge, 1999a). In this basic sense, the skill of way-finding originated from an essential human need to find food and water, to shelter and to avoid danger (Careri, 2002;Ingold, 2000).

Way-finding is understood as being: a task (Arthur and Passini, 1992), a skill (Ingold, 2000), a process (Arthur and Passini, 1992;Golledge, 1999b), an ability (Downs and Stea, 1977), and a logic (Arthur and Passini, 1992). It is the utilisation of 'natural skills and abilities and memory based spatial knowledge' (Golledge, 1999a,p. 7). It is focused on a 'need to know the world around us' (Downs and Stea, 1977,p. 4). Way-finding is the way in which surroundings are encountered, passed through and subsequently remembered (Arthur and Passini, 1992).

Way-finding is a cognitive and behavioural process (Martin Raubal and Egenhofer, 1998) which is also physical (Arthur and Passini, 1992). It is a form of spatial problem solving with the aim of reaching a destination (Jacobson, 1999;Arthur and Passini, 1992) and is a 'purposeful, directed, and motivated activity' (Golledge, 1999a,p. 6) [figure 2.3.1].

A way-finding task is never solely based on the current context of someone's surroundings, instead it is a fusion of both previously encountered and present experiences (Downs and Stea, 1977;Lynch, 1960;Golledge, 1999a;Arthur and Passini, 1992).

Arthur and Passini (1992,p. 27) outline that each way-finding task revolves around six factors:

- 'Taking into account previous experiences
- Reading and evaluating the environmental context
- Trying to understand the spatial characteristics of the setting
- Taking in the information displayed on signs maps and indicators
- Assessing different options
- Considering the time factor, the interest, or the security that goes with taking a given route.'

Way-finding is a daily activity (Allen, 1999b) which everyone, regardless of ability (Arthur and Passini, 1992), takes part in as they move through their surroundings. It takes place within surroundings of different scales [e.g. a cityscape (Lynch, 1960) or within a building or a sequence of spaces (Arthur and Passini, 1992)]. In order to fully define the term Way-finding within this thesis, it is necessary to clarify commonly associated terms: Orientation, Navigation and Cognitive Maps. These are often used interchangeably within way-finding literature. Although they each form part of the overall process of way-finding [to varying degrees] it is necessary to define them individually. In addition to defining these concepts this section will explore the categorisation of types of way-finding and the idea of conscious and unconscious way-finding. It will also investigate the state of being lost. This Review will contribute to an overall understanding of the nature of way-finding.

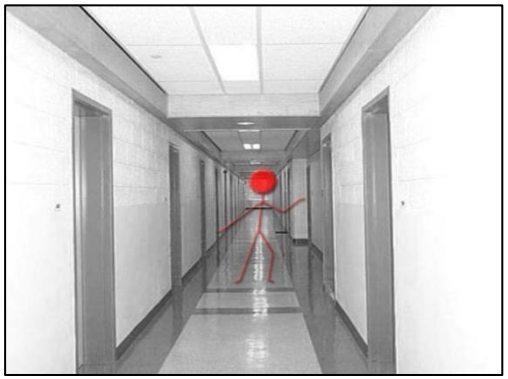


Figure 2.3.2: Near-Space Orientation

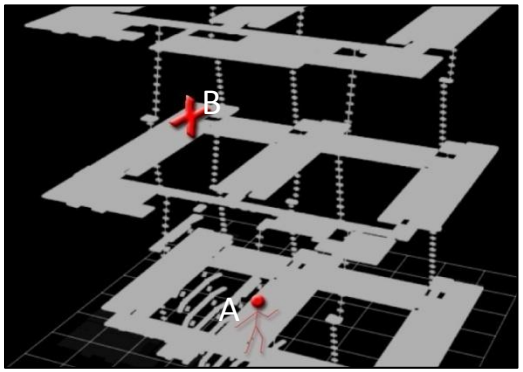


Figure 2.3.3: Far-Space Orientation

Orientation

'How a person is orientated for travel is crucial to successful travelling'

(Harper and Green, 2000,p. 2)

The term Orientation, used in its broadest sense, is the determining of the body's position, [while stopped and while in motion] in relation to a set of surroundings and other locations (Downs and Stea, 1977). It is deemed to be the first step in the way-finding process (Harper and Green, 2000). Orientation is sub-divided into two categories (Hersh and Johnson, 2008):

1. Spatial Orientation, [also defined as near-space orientation], is the determining of the body's position within the immediate context of a space [e.g. in a corridor] and maintaining walking direction along the route [figure 2.3.2].
2. Geographic Orientation, [also defined as far-space orientation], is the determining of the body's position within the larger context of a building in regard to the sought destination [figure 2.3.3]. It is the knowledge of position A [the origin] in relation to position B [the destination].

Harper and Green (2000) summarise orientation as: 'Information about position, direction, desired location, route, route planning etc. are all bound up with the concept of orientation' (p. 2).

Navigation vs. Way-finding

'Way-finding has to be distinguishable from navigation' (Ingold, 2000,p. 220).

Ingold (2000) and Golledge (1999b) make a clear distinction between navigation and way-finding [or 'path-finding' (Golledge, 1999b)]. Ingold (2000) explains: 'way-finding, […] resembles storytelling [rather] than map-using. To use a map is to navigate by means of it:

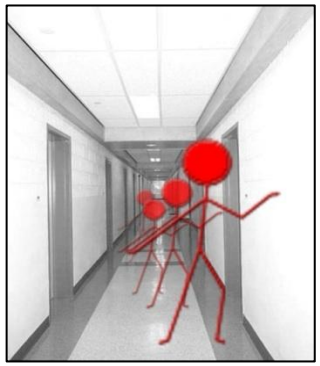


Figure 2.3.4: Navigation

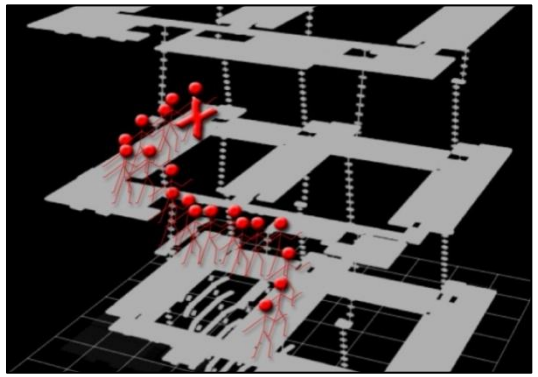


Figure 2.3.5: Way-finding

that is, to plot a course from one location to another in space. Way-finding, by contrast, is a matter of moving from one place to another in a region' (pp 219-220).

Golledge (1999a) considers them both to be 'guiding processes' (p. 6) which are utilised as people move through their surroundings. In comparing the two, he defines that navigation [like orientation] is part of the process of way-finding. Navigation is concerned with the action of walking through a space [figure 2.3.4], while way-finding is the cognitive process of identifying and choosing a route which leads from a starting point [origin] and results in getting the way-finder to their destination (Golledge, 1999a). This movement of the body is the process of navigating human locomotion or travel (Harper and Green, 2000).

Way-finding

Way-finding is part of the bigger picture of getting from A to B. It is user orientated and is the cognitive, strategic, and behavioural task of planning movement (Arthur and Passini, 1992). It is encompassing of the overall picture of knowing what direction and course of action is needed to reach a destination [figure 2.3.5].

The process of way-finding is broken-down by Downs and Stea (1977) into four sub-tasks of:

1. Orientation

2. Choosing and planning the route

3. Keeping on the right track [Navigation]

4. Discovering [and stopping at] the destination.

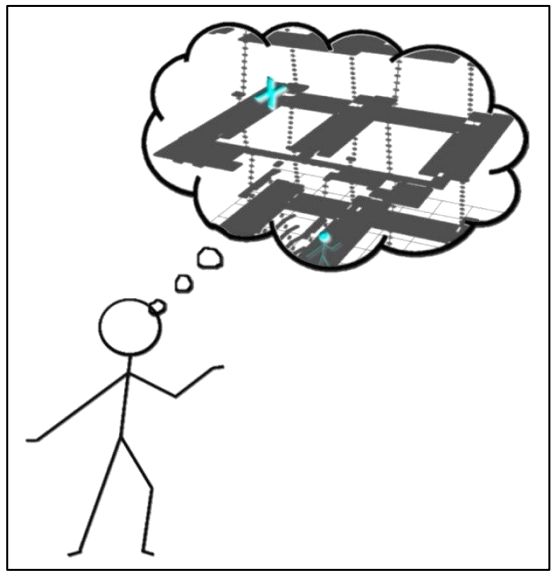


Figure 2.3.6: Cognitive Map

Cognitive Map

Although the processes of cognitive mapping will be investigated within Section 2.3.2, Cognitive Map is defined in this section as it is another term which is associated with way-finding.

The cognitive map [also known as mental map or spatial image, (Downs and Stea, 1973b) or environmental image (Lynch, 1960)], was introduced by Tolman in 1948 to replace a previous term of 'spatial image' (Golledge, 1999a;Downs and Stea, 1973e). It is not a map as in the cartographers map, (Downs and Stea, 1973a) but is interpreted as giving map-like representations of the real world (Golledge, 1999a).

A cognitive map is the 'overall mental image or representation of the spaces and the layout of a setting' (Arthur and Passini, 1992,p. 23). Described as 'an image' (Lynch, 1960) which is held in the mind, it is also referred to as a person's 'internal way-finding aid' (Golledge, 1999a) [figure 2.3.6].

Cognitive Maps are dependent on the person who is creating them and they are always constructed from a 'convenient sets of symbols that we all subscribe to, recognize, and employ (Downs and Stea, 1973c,p. 10). The Cognitive Map as a 'product' which enables a person to gain knowledge of where they are to form a plan in relation to where they want to go (Downs and Stea, 1977; 1973c).

Types of Way-finding

Way-finding environments have been classified according to the skill or problem-solving strategy that is required to negotiate them (Hill and Ponder, 1976). Familiarity of the environment also impacts on the way-finding task (Arthur and Passini, 1992;Golledge, 1999a).

In regard to any type of environment, Allen (1999a,pp 48-50) identifies three types of way-finding task: 1. travel to a familiar destination, 2. exploratory travel, and 3.travel to a novel destination. In contrast and in relation to specific environments, Arthur and Passini (1992,pp 76-81) base their classification of types on five way-finding settings [which they define as 'conditions']. These include:

1. Travel Conditions [e.g. transport hubs]

2. Working Conditions [e.g. offices or universities]

3. Playing Conditions [e.g. leisure centres or parks]

4. Retail Conditions [e.g. shopping centres]

5. Emergency Conditions [e.g. emergency exits]

Within these environment types they categorise way-finding tasks as: 1. normal, 2. recreational and 3. emergency (Arthur and Passini, 1992).

It is clear from both Allen and Arthur and Passini, that there are different way-finding tasks which take place in different settings. The context of the environment and the way-finding task influences the type of way-finding a person carries out (Arthur and Passini, 1992;Hill and Ponder, 1976;Allen, 1999a).

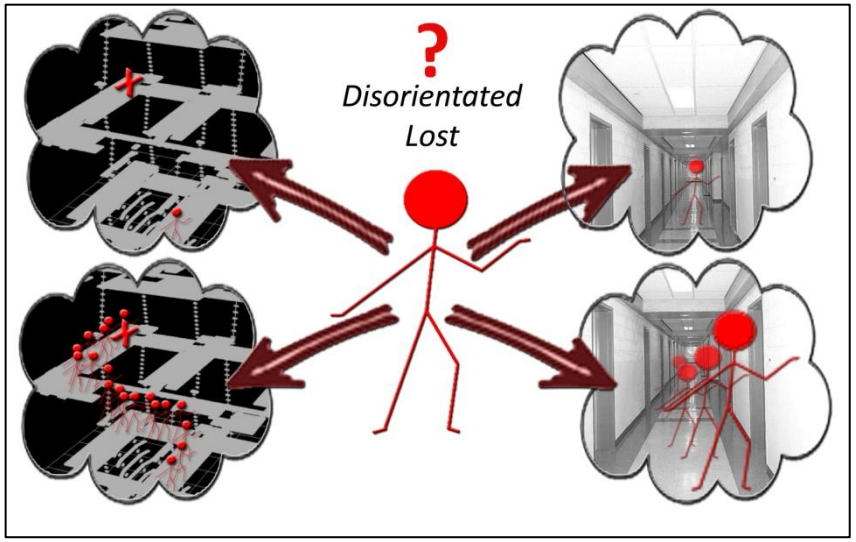


Figure 2.3.7: When Way-finding Fails: Disorientated and Lost

The way-finder is not able to answer one or all of a series of questions:

Where am I in this space?

Where is the location in relation to where I am?

How can I form a plan to get to the destination?

Conscious vs. Unconscious Way-finding

Way-finding is not always a task that we are aware of carrying out (Downs and Stea, 1977). It is both a process which can be conscious and unconscious. Levels of this awareness depend on the person and the context of their surroundings.

Within a familiar setting we can find our way without really thinking about it. As Ingold (2000) explains, 'we know where we are, and how to get to where we want to go – ordinary life would be impossible if we didn't' (p. 219). When however, we find ourselves in a new set of surroundings, we are suddenly aware of having to do something. We have a 'way-finding goal' (Arthur and Passini, 1992) to get from A to B. This feeling of having to do something is the recognising of the processes associated with way-finding. This awareness of way-finding is especially heightened if we become disorientated, and even more so if we lose our way (Downs and Stea, 1977).

When way-finding fails: The state of being disorientated or lost

As well as causing interruption on the way to a destination, becoming disorientated or lost impacts greatly on a way-finders psychological and emotional wellbeing (Arthur and Passini, 1992). It is the direct result of a failing or weakness in the process of way-finding (Golledge, 1999a).

As illustrated in figure 2.3.7, the way-finder is no longer enabled to do one or all of the following sub-processes: 1. locate the body's position within a space [i.e. orientate themselves], 2. know where and if their destination is within the setting [i.e. determine the location of the destination], and/or 3. is no longer able to follow or construct a way-finding plan to reach the destination (Arthur and Passini, 1992).

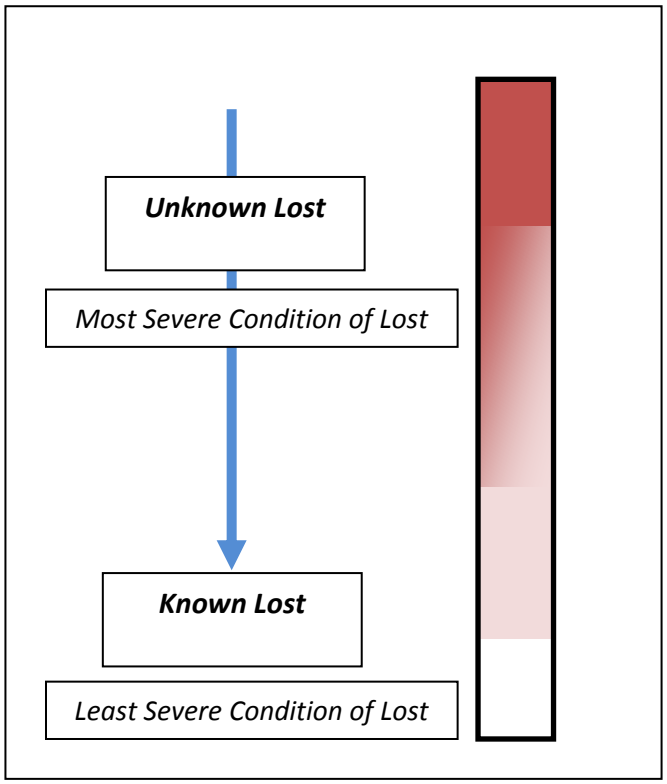


Figure 2.3.8: The Spectrum of being Lost

The impacts of being disorientated or lost are described by Arthur and Passini (1992)as a 'chain of emotional reactions' (p. 8) ranging from blaming oneself through feelings of frustration with the self and anxiety about being late, to rage, irritation and bitterness at not being able to successfully way-find.

Working within the external environment, in regard to the activity of orienteering, Crampton (1988 p. 43) explains that there is a spectrum of being 'lost'. As illustrated in figure 2.3.8, his spectrum concentrates on the most severe state and least severe state of being lost. If the way-finder is not aware that they are lost he/she is thought to be – 'unknown lost' [i.e. the way-finder has yet to realise that they are lost and believes that they are in a particular location when they are in fact in another]. If the way-finder is aware of being lost he/she is thought to be – 'known lost' [i.e. the way-finder realises that they are lost](Crampton, 1988). This is an important distinction to make when describing the state of being lost as the way-finder's behaviour and reaction to being lost will change their way-finding goal [i.e. if they realise they are lost they can form a new way-finding goal to become un-lost]. This feeling of being lost or disorientated is one of the most extreme failures of a way-finding process (Golledge, 1999b). Conscious measures taken to alter the state of being lost must enable the person to get on the right track to reach the destination (Crampton, 1988).

Bringing the focus of being lost back into the realm of buildings and architecture, Carlson et al. (2010) define that people become lost in buildings because of three things: 1. the setting, in relation to how it enables/disables ability to way-find, 2. the way-finder, in relation to how their cognitive maps are formed, and 3. the way-finder, in relation to what tactics they employ to get around the setting. Appropriate way-finding design can assist in aiding a person in getting from A to B (Arthur and Passini, 1992).

2.3.1 Summary

This section has described the nature of way-finding. It has defined terminology associated with the concept of way-finding [i.e. orientation, navigation and cognitive maps] and has also considered categorisations of way-finding.

It has explored the idea of conscious and unconscious way-finding and has considered what happens when a way-finder becomes lost or disorientated. Now that the general aspects of way-finding have been considered, this next section will investigate the current theoretical ways of thinking about way-finding and will present five Models of Way-finding.

2.3.2 Ways of thinking about Way-finding: The Processes

The way-finding process has been found to be a demanding topic to investigate and make sense of (Ingold, 2000;Arthur and Passini, 1992;Golledge, 1999a), especially in terms of understanding cognitive maps and cognitive mapping (Downs and Stea, 1973d).

Reasons which contribute to this difficulty are due to:

- different uses of the same or similar terminology in regard to way-finding (Ingold, 2000) and cognitive map (Downs and Stea, 1973d;Downs and Stea, 1973b;Golledge, 1999a)
- the confusion surrounding elements of way-finding (Ingold, 2000,p. 219)
- the difficulty people [way-finders] have in expressing way-finding experiences which are largely internalised and difficult for researchers to extract (Arthur and Passini, 1992;Golledge, 1999a;Downs and Stea, 1977).

This section will outline five current ways in which way-finding processes are understood within: 1. Cognitive Psychology (Downs and Stea, 1973c), 2. Anthropology, Phenomenology

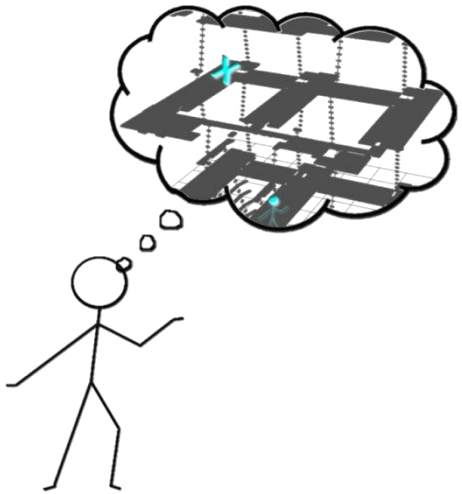
and Ecology (Ingold, 2000), 3. Architecture and Design (Arthur and Passini, 1992), 4. Psychology and Rehabilitation (Hersh and Johnson, 2008) and 5.Computer Science (Harper and Green, 2000). As well as investigating the processes of way-finding in general, special attention will be paid to understand these processes in relation to visual loss. These five models are introduced in figure 2.3.9 by way of: Discipline [where the model/research originated], Process Model, Key Researchers [which are referred to throughout the explanation] and the Model Focus.

	01	***02***	***03***	***04***	***05***
Discipline	Cognitive Psychology	Anthropology, Phenomenology & Ecology	Architecture & Graphic Design	Psychology & Rehabilitation	Computer Science
Process Model	***Cognitive Mapping***	***Skill***	***Information Processing***	***Process of Locomotion***	***Travel Task Framework***
Researcher[s]	Downs & Stea, Appleyard,Golledge, Lynch, Ruddle & Péruch	Ingold	Paul Arthur & Romedi Passini	Brambring	Harper & Green
Model Focus	**Imaging**	**Personal Skill**	**Processing Information**	**Task**	**Task**

Figure 2.3.9: The Process Models of Way-finding

Concentrating on Visual Loss

Each of these models will now, in turn, be further described. Together they will form a theoretical foundation to understand how the way-finding processes are currently understood.



A cognitive map is:

- a *'product'* (Downs and Stea, 1977)
- the *'overall mental image or representation of the spaces and the layout of a setting'* (Arthur and Passini, 1992,p. 23)
- *'an image'* (Lynch, 1960) which is held in the mind
- a person's *'internal way-finding aid'* (Golledge, 1999a)

Figure 2.3.10: A Cognitive Map

1. Process of Cognitive Mapping Model

Having defined a Cognitive Map within section 2.3.1, [summarised in figure 2.3.10] the processes of constructing the Cognitive Map will now be considered.

Understanding the processes of cognitive mapping is not an easy task (Downs and Stea, 1973a) and as explained throughout the following models of: Skill , Information Processing, Process of Locomotion and Travel Task Framework, the existence, constructing, and subsequent use of a cognitive map is debated across different disciplines (Ingold, 2000;Arthur and Passini, 1992;Hersh and Johnson, 2008,p. 172;Harper and Green, 2000).

Downs and Stea (1973a,p. 9) offer a formal definition: 'Cognitive mapping is a process composed of a series of psychological transformations by which an individual acquires, codes, stores, recalls, and decodes information about the relative locations and attributes of phenomena in his everyday spatial environment'.

Cognitive mapping is an activity: a 'process of doing' (Downs and Stea, 1977,p. 6) which creates a product – the cognitive map (Downs and Stea, 1973a). It is the processing, representation and structuring of spatial information through a form of survey which enables a person to move between places (Downs and Stea, 1973a;Ruddle and Péruch, 2004;Arthur and Passini, 1992).

Golledge (1999a) considers cognitive mapping to be a process of learning, experiencing and recording both qualitative and quantitative information of: 'Points' [landmarks and reference nodes], 'Lines' [routes paths and tracks], and 'Areas and Surfaces' (p. 15). [Other examples of Structures are illustrated within Section 3.3 of this Review]. From the perspective of cognitive psychology the cognitive map exists if the person acts like it exists (Downs and Stea,

1973a). If the person is able to orientate themselves within the cognitive map they are able to take measures to get to their destination (Arthur and Passini, 1992).

Cognitive mapping is a process which is largely dependent on a person's ability to interpret their surroundings (Downs and Stea, 1977). The constructing of images is deemed to be reliant on factors of 'legibility', a visual quality which Lynch (1960) defined as the ease with which people understand the layout of a place. He elegantly describes this as a 'two-way process between observer and observed' (p. 11).

Awareness, however, is drawn to four things:

1. The information obtained is never a complete record of the way-finding context (Golledge, 1999a;Lynch, 1960).
2. Cognitive mapping is not an easy process for everyone and it is largely dependent on the person and their surroundings (Arthur and Passini, 1992).
3. Creation of the image is subjective and is always based on past memories as well as current and evolving experiences (Lynch, 1960).
4. Each person's image varies based on how they observe, understand and arrange the perceived details (Lynch, 1960).

Visual loss and the process of cognitive mapping

Exploring cognitive mapping by people who have visual loss has also been a demanding challenge. Although investigations into visual loss and cognitive mapping have been carried out (Klatzky. RL et al., 1990 ;Passini et al., 1990), Kitchin (1997) puts into question the knowledge drawn from these studies. He highlights several deficiencies and questions the validity of both their methodological approaches and generalisations of findings.

According to Kitchin (1997), previous studies have been:

1. Based on relatively small samples [where one or two people have been involved]. Therefore the results are based on small samples making it difficult to draw generalisations.
2. Based within laboratory settings as opposed to being in the real-world environments.
3. Methodologically flawed as the respondents were provided with different amounts of spatial information [at their request].
4. Without specific relevance and focus.

When considering the lessons learned from previous studies, Kitchin (1997) makes five main recommendations which are highly relevant in terms of this thesis:

1. Multiple methods need to be utilised.
2. The methods should be tested, be evolving in nature and be trialled.
3. A larger sample size of Participant needs to become involved – 'a minimum of ten respondents' (p. 372).
4. The investigation must be carried out in a real-world setting as opposed to a laboratory.

In regards to other literature, three interesting aspects of the cognitive mapping process by people with visual loss have been reported. Dodds (1982) [also reported in Harper and Green (2000)] found that people with visual impairment tend to think of the real world in an ego-centric way when compared to sighted people. Congenitally blind people are able to carry out complex spatial operations (Downs and Stea, 1973a) however, in comparison to visually able people, people with visual loss tend to take part in making pre-travel preparations before they travel (Passini et al., 1990).

Against cognitive mapping

Arguments against the process of cognitive mapping have highlighted that it fails to do two things:

- recognise or consider the skill of way-finding (Arthur and Passini, 1992,p. 24;Ingold, 2000) for example 'traditional navigation' whereby people have 'developed very sophisticated navigational skills' (Arthur and Passini, 1992,p. 24).
- acknowledge that the person is unable to have complete knowledge of the environment before they arrive (Arthur and Passini, 1992)

This encouraged the development of a different understanding of the way-finding processes (Arthur and Passini, 1992;Ingold, 2000).

The next model will consider Ingold's (2000) notion of the skill of being in the environment following which, Arthur and Pasini's (1992) Information Processing Model will consider the existence and use of the cognitive map in a different way to the Psychologists.

2. The Skill of being in the Environment

An argument against the Cognitive Mapping Process is put forward by Social Anthropologist Ingold (2000). He argues that there is no such thing as a map and questions the idea of a map, both in the head and the physical form. He states that way-finding is not a mechanical process where the way-finder holds all the knowledge within a cognitive map. He claims that way-finding is a skilled act which the way-finder has, through experience, 'fine tuned' based on previous experiences and current surroundings. It is temporal as opposed to being a spatial representation and is dependent on the person in a place at a certain time.

While moving through the surroundings he states that the person is always responding to what is going on around him/her. He explains that this is a perceptual undertaking of investigating, reacting and changing the direction of travel in response to the surroundings (Ingold, 2000).

This idea of skill based way-finding is something which is portrayed on a larger and more extreme scale as the Tubu women, known as 'the great navigators', way-find for their survival through the desert to find water. They use the sand dunes as landmarks as they cross the Ténéré desert in the Sahara. They know that they are going in the right direction if the moon is behind them. This skill of seeking the water well is passed on from mother to daughter (Stone, 2011).

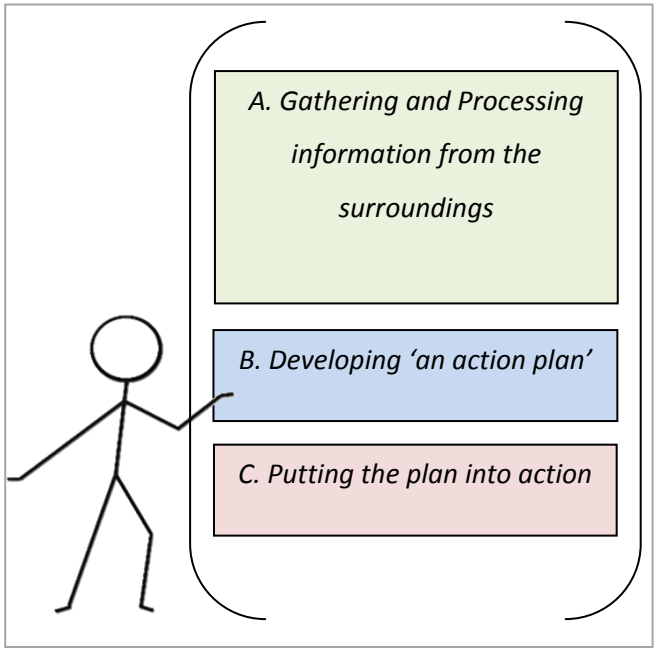


Figure 2.3.11: The Information Processing Model according to Arthur and Passini (1992,p. 25).

3. The Information Processing Model

In building a case for their model, Arthur and Passini (1992) describe the processes of way-finding as a logic comprised of decisions. Their model of way-finding can be understood as a three point process [figure 2.3.11] incorporating:

- A. Information Processing
- B. Decision Making
- C. Decision Executing

They are sub-processes which are iterative and repetitive and they link and inform one another but do not occur in a specific order. Within this model the cognitive map is an element of the Information Processing phase (Arthur and Passini, 1992).

As opposed to the cognitive psychologists who put the importance on the cognitive map, Arthur and Passini put the importance on the phase of Information Processing. They highlight that although they do not disregard the cognitive map, they do think about it differently – 'we merely situate it within the much larger process of spatial problem solving' (p. 25). Each of these processes will now be briefly described.

A. Information Processing

'It is only when a person is provided with all the information in the actual setting that the decision plan can be completely formulated.' (Arthur and Passini, 1992,p. 28)

Information Processing is a two way interaction between a person's perception [their sensorial experience of an environment] and their cognition of the surroundings [it is their understanding of what is perceived] (Arthur and Passini, 1992;Lynch, 1960). The phase of Information Processing in this Model is fundamental to inform the phases of Decision Making

and Decision Executing. 'Space is perceived physically by all the senses and cognitively in our mind; its different dimensions are defined by spatial phenomena' (Bielefeld, 2009,p. 35). In order to way-find, [in both known and new environments], a way-finder uses and responds to the information that surrounds them both physically and cognitively (Arthur and Passini, 1992). Examples of way-finding aids types will be fully considered within Review 4. However within this model, Arthur and Passini (1992) consider 'the things we remember' when way-finding in buildings to be: 'The form of the building', 'Visibility and access', 'Use' and 'Symbolic significance' (p. 37).

B. Decision Making

After making the first decision – to leave A and get to B [B being the destination] the other decisions are based around getting here (Arthur and Passini, 1992). Decision Making is the forming of the action plan and Decision Executing is the acting out of the plan [e.g. if part one of the action plan is to turn left after the red door then part one of the decision executing is to turn left after the red door]. Arthur and Passini (1992) claim that there are many decisions to be made on a way-finding trip, the structuring of these decisions form a hierarchy. An example of this hierarchy is illustrated in figure 3.2.12 when a trip to the doctors considered.

In understanding way-finding in this way they state that a way-finding task becomes more 'manageable [...] as a particular aspect of the problem can be treated while still keeping in mind the problem as a whole' (p. 30). They also identify that a route travelled is in actual fact a logged series of encounters which can be retraced, remembered and recognised the next time the setting is visited. 'A plan of action is a mental solution to a way-finding problem, but it does not in itself take you physically to your destination'(p. 31). These decisions need to be actioned – hence the phase of Decision Executing.

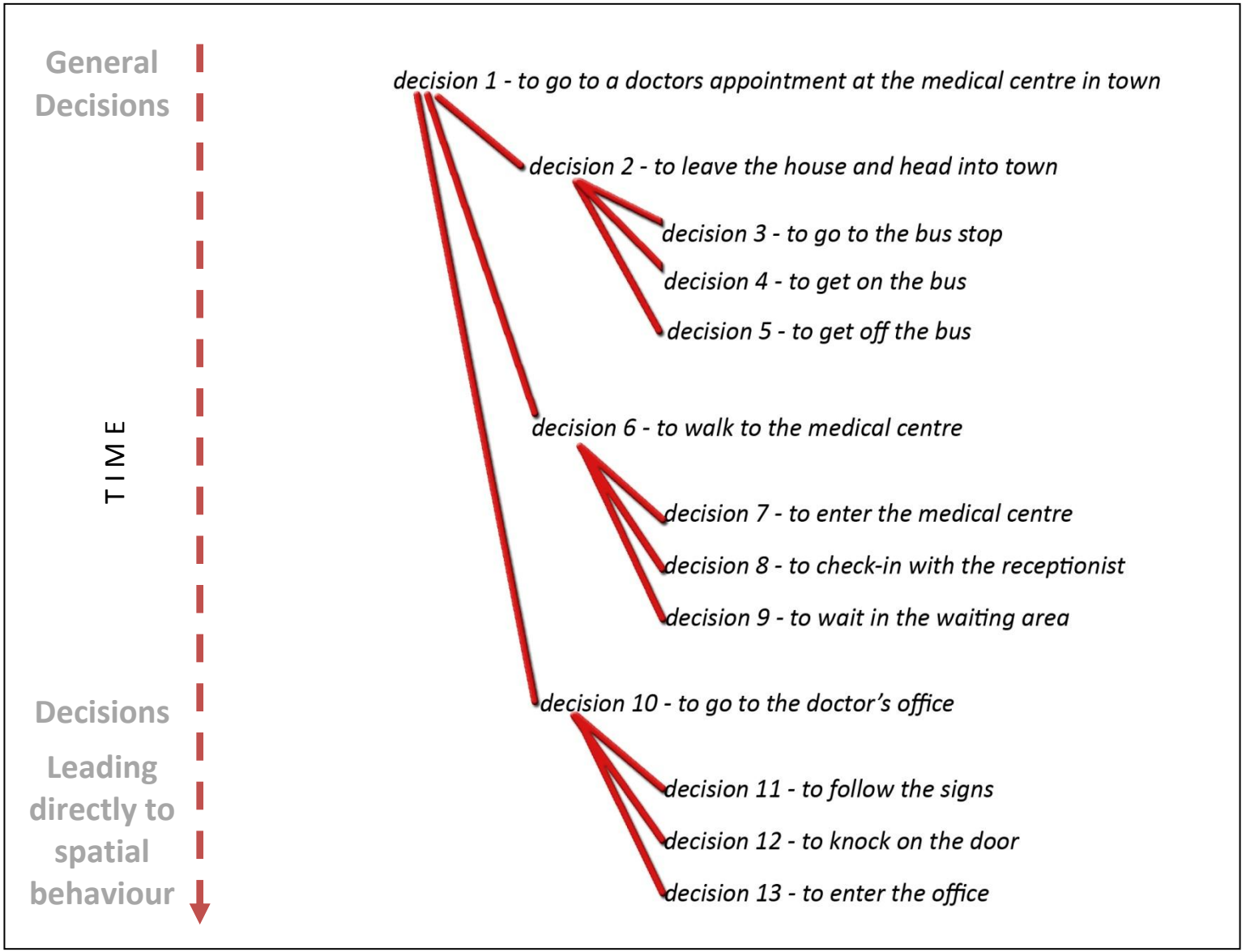


Figure 2.3.12: A trip to the doctors using Arthur and Passini's Information Processing Model (Arthur and Passini, 1992,p. 25)

C. Decision Executing

Decision Executing changes the action plan into behaviour at the appropriate stage along a way-finding route and 'each decision must be transformed onto the right behaviour at the right place' (Arthur and Passini, 1992,p. 31). A decision is constructed of two parts: 1. Behaviour, e.g. moving up the stairs or finding some signage] and 2. An environmental entity, [e.g. the stairwell, steps or information signage] (Arthur and Passini, 1992).

These two parts work together to assist a way-finder through their environment. When drawing on one of the Decision Making processes from figure 2.3.12 – to knock on the door – the way-finder must first of all match their image of what this specific door looks like to the door in the environment [e.g. if the mental image is a blue door with the doctors name on it, then this is the door they are seeking]. Then they can execute the decision to knock on the door. However, if they 1. cannot find this door, or 2. the door has changed in some way [e.g. it is now red instead of blue, or the name on the door has changed] then new decisions have to be made.

According to this model, way-finding is a logic which is composed of three components: Decision Making and Decision Executing which are both informed by Information Processing (Arthur and Passini, 1992).

The next two models concentrate on the way-finding of people who are blind: The Model of Locomotion introduced in 1985 by Brambring (Hersh and Johnson, 2008,p. 172) and the Travel Task Framework Model introduced in 2002 by Harper and Green.

4. The Model of Locomotion [1985]

Brambring (Hersh and Johnson, 2008) claims that in moving through an environment to reach a destination, a way-finder, who is blind, must be able to do three main things to remain independent. They must be able to:

1. Detect obstacles - which involves either the obstacles being perceived in order to be avoided or utilising the obstacles as landmarks which are familiar;

2. Identify a landmark[s] - which involves them identifying stable landmarks [i.e. landmarks which are not likely to change] and way-find according to them;

3. Orientate position [both spatially and geographically] within the immediate context and in relation to the destination.

Brambring's Model of Locomotion (Hersh and Johnson, 2008,p. 172) [figure 2.3.13] is hierarchical. It is ordered by top level codes of: Perception of Objects**,** which is largely based on sensorial information and Process of Orientation, which is based on cognitive information**.** Perception of Objects is then divided into Obstacle Detection and Identification of Landmarks. Process of Orientation is divided into Spatial Orientation and Geographical Orientation.

Two-way links are recognised as occurring between:

1. Obstacle Detection and Identification of Landmarks

2. Identification of Landmarks to [higher level] Process of Orientation

3. Spatial Orientation to Geographic Orientation

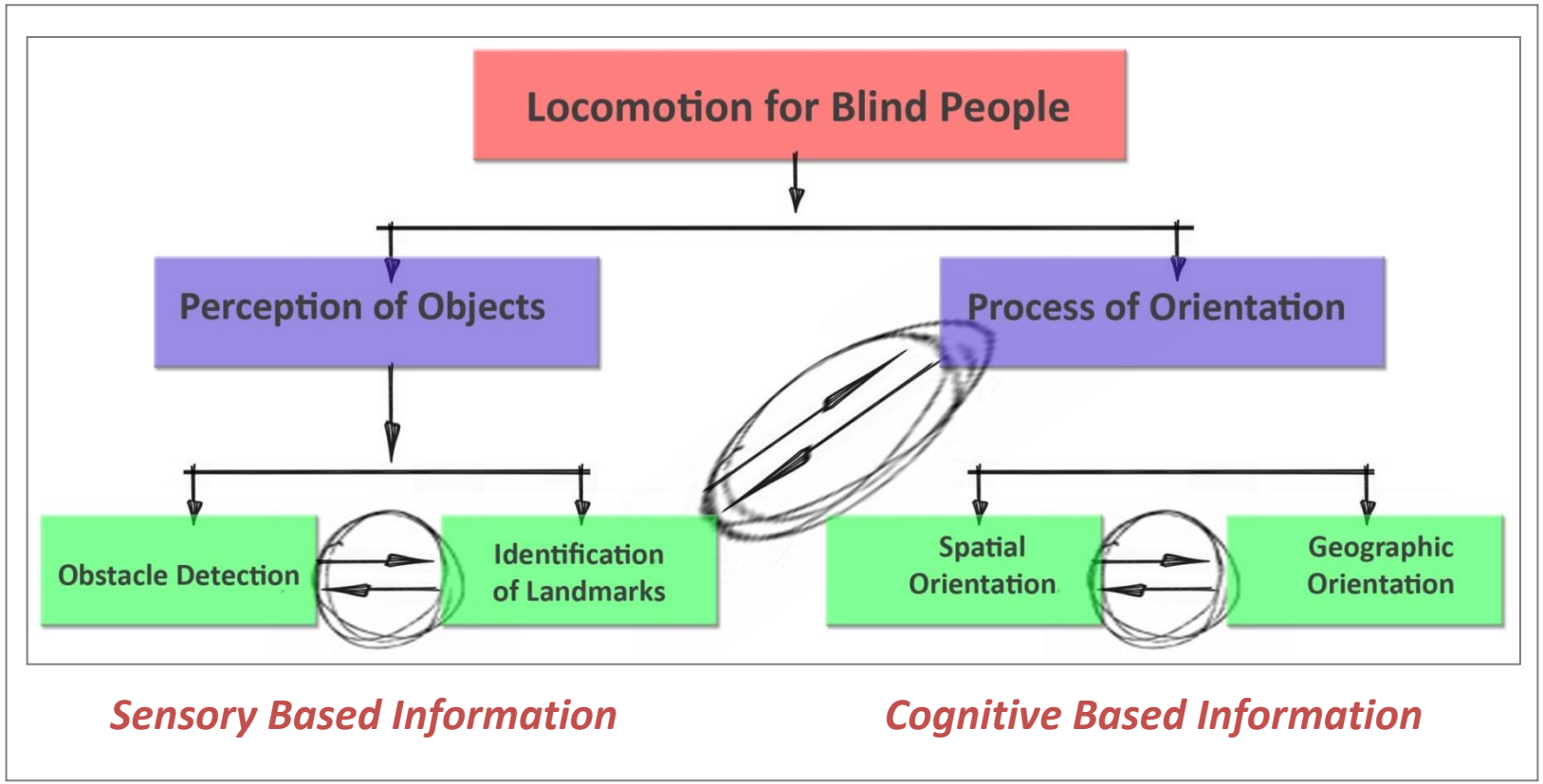


Figure 3.2.13: 'Brambring's Model of Locomotion' (Hersh and Johnson, 2008)

Brambring's Model of Locomotion is a simple hierarchy which identifies the main activities and encounters a blind person could experience when finding their way in a building. It specifically:

- highlights the importance of obstacle detection, landmarks and orientation.
- identifies that obstacles are not just environmental objects which impede travel and should be avoided, but that they can also be used by the blind way-finder as a form of landmark and reassurance.

However, this model does not provide insight into the sequential experience of way-finding or any specific application details which can be useful to an architect or designer. It presents the user as being a blind person and so does not take into account the varying scale of visual loss and how, as a variable, visual ability impacts or influences the travel task.

Although it indicates that the components of the hierarchy are processes, Brambring does not describe the details of the processes, or sub-processes. For example, under Arthur and Passini's (1992) model of way-finding it is possible that a person who becomes lost, can re-evaluate their surroundings and form a new 'plan of action' through the continual and iterative nature of their process of Information Processing, Decision Making and Decision Execution. Brambring's Model does not take into account or allow for experiences such as becoming lost.

5. The Travel Task Framework Model [2002]

With the Travel Task Framework Model Harper and Green's objective was to provide understanding of a 'travel framework' in relation to visual loss to asses current and future visual loss travel aids. Building on Brambring's Model, they outlined that a framework for describing travel of visually impaired people would have to address five fundamental themes:

1. *Obstacle detection and avoidance*
2. *Mental Maps*
3. *Egocentricity*
4. *Regularity of environment*
5. *Provide spatial information*

In comparison to Brambring's model, they describe a *'flow of travel'* which is sequential and *'looping'* in nature. It encompasses eight stages of *'travel task'* (Harper and Green, 2000), which are categorised [and illustrated in figure 2.3.14] as:

1. Aim or aimlessness
2. Pre-plan journey
3. Decide on start and end points
4. Journey
5. Keep to track
6. In-route guidance
7. Move to next point
8. Archive next point

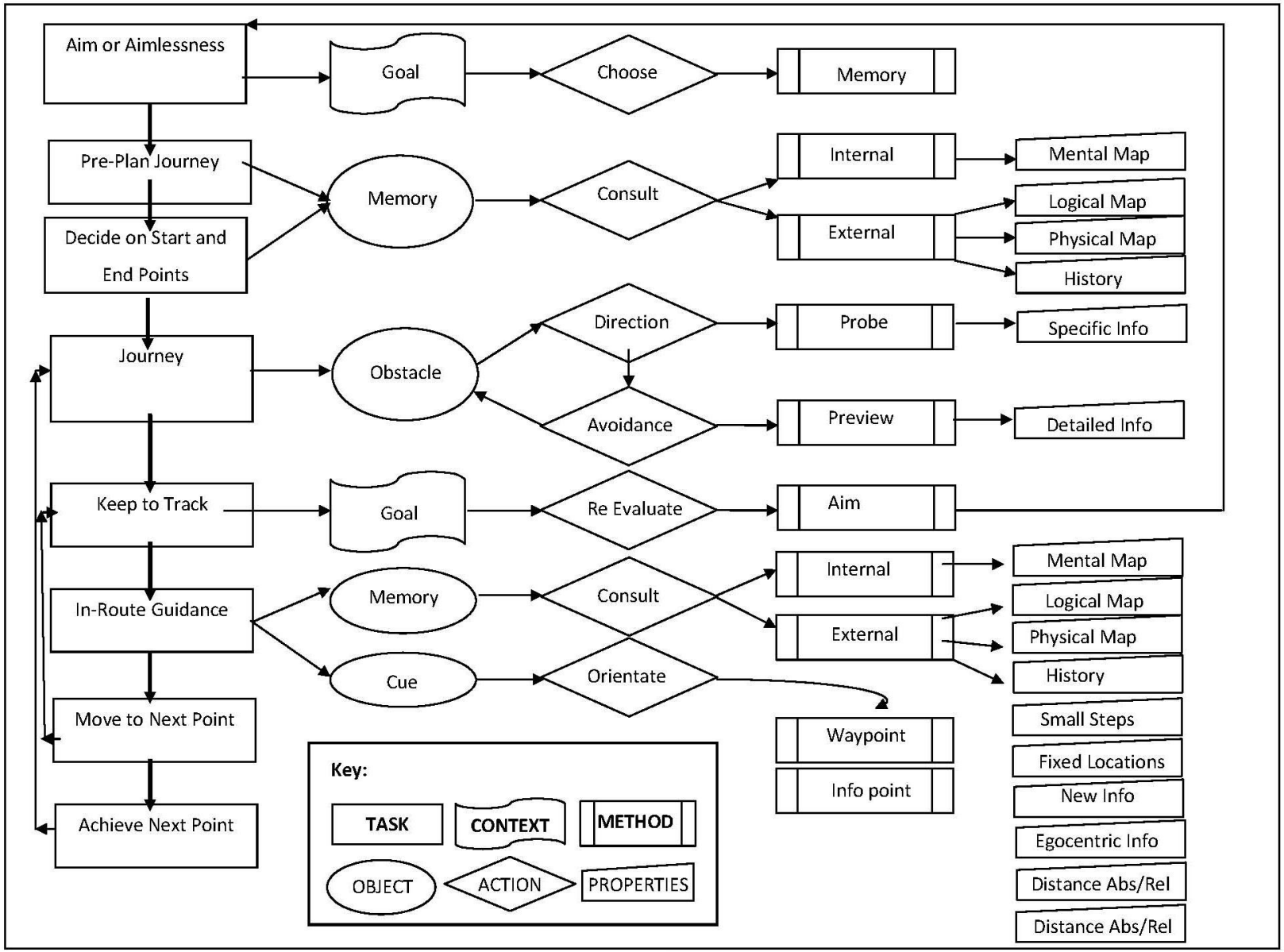


Figure 2.3.14: Harper and Green's 'Flow of Travel'

This model takes into account the pre-travel decisions which occur previous to embarking on way-finding, as well as the obtaining of information before travel ['Pre-plan Journey']. They define that iterative links or 'looping' backwards can occur between 'Achieve Next Point' to 'Journey' and from 'Move to Next Point' to 'Keep to track' and from 'Keep to track' to 'Aim or Aimlessness'.

This model differentiates between way-points [defined as 'an arbitrary point' such as a junction, or 'a specific point' such as an audio cue] orientation points [which they fail to define] and information points [defined as a means of gathering complex information such as a timetable]. In comparison to Brambring's Model, this model organises navigation and orientation objects as memories, obstacles and cues with a set of associated actions linked to a method with a number of association properties. For example the task of 'In Route Guidance' involves utilising Memory [as the object] to Consult [as the action] to Internally [as the method] form a Mental Map [as the property] in order to 'Move to Next Point' [as the next task] in the sequence. They claim that the travel task is a more complex set of processes than Brambring's Model and state that in comparison, their model is a 'user task analysis model of real-world-journeying' (Harper and Green, 2000).

The detail that this model provides, in contrast to Brambring's, is an in-depth consideration of the processes a person takes part in to travel and takes into account the iterative and reoccurring nature of some of the processes. Harper and Green's model takes into account the role of the cognitive map and considers cognitive mapping whereas Brambring does not.

Neither model takes into account previous trips or trips that have taken place in the same context before. Each journey is considered as an isolated incident and therefore does not account for the learning, acquiring and storing of experience for next time.

2.3.2: Summary

This section has outlined five ways in which way-finding processes are understood within 1. Cognitive Psychology (Downs and Stea, 1973c), 2. Anthropology, Phenomenology and Ecology (Ingold, 2000), 3. Architecture and Design (Arthur and Passini, 1992), 4. Psychology and Rehabilitation (Hersh and Johnson, 2008) and 5. Computer Science (Harper and Green, 2000).

2.3.3 Types of Coding Structures [Theory and Practice]

The different models of understanding the processes of way-finding have influenced a series of structures used within: Way-finding, Architecture, and Network Analysis. These types of structures are fully illustrated in Table 2.3.1 [01 and 02] and draw on: Lynch's (1960)Elements of the City, Appleyard's (1969; 1970) Coding Structures of the City, Hillier and Hason's Space Syntax (Hillier, 2007), IDEO's User Sequence or Journey (Myerson, 2001), Arthur and Passini's (1992) Architectural Way-finding Communications, Unwin's (2000) Basic Elements of Architecture and Ching's (1996) Basic Elements, Systems and Orders [which are divided into Primary Elements of Form, Properties of Form, Form and Space, Organisation, Circulation, Proportion and Scale and Ordering Principles].

These tables are a break-down of a selection of structures used with theory and practice. Similarities between structures are identified by colour.

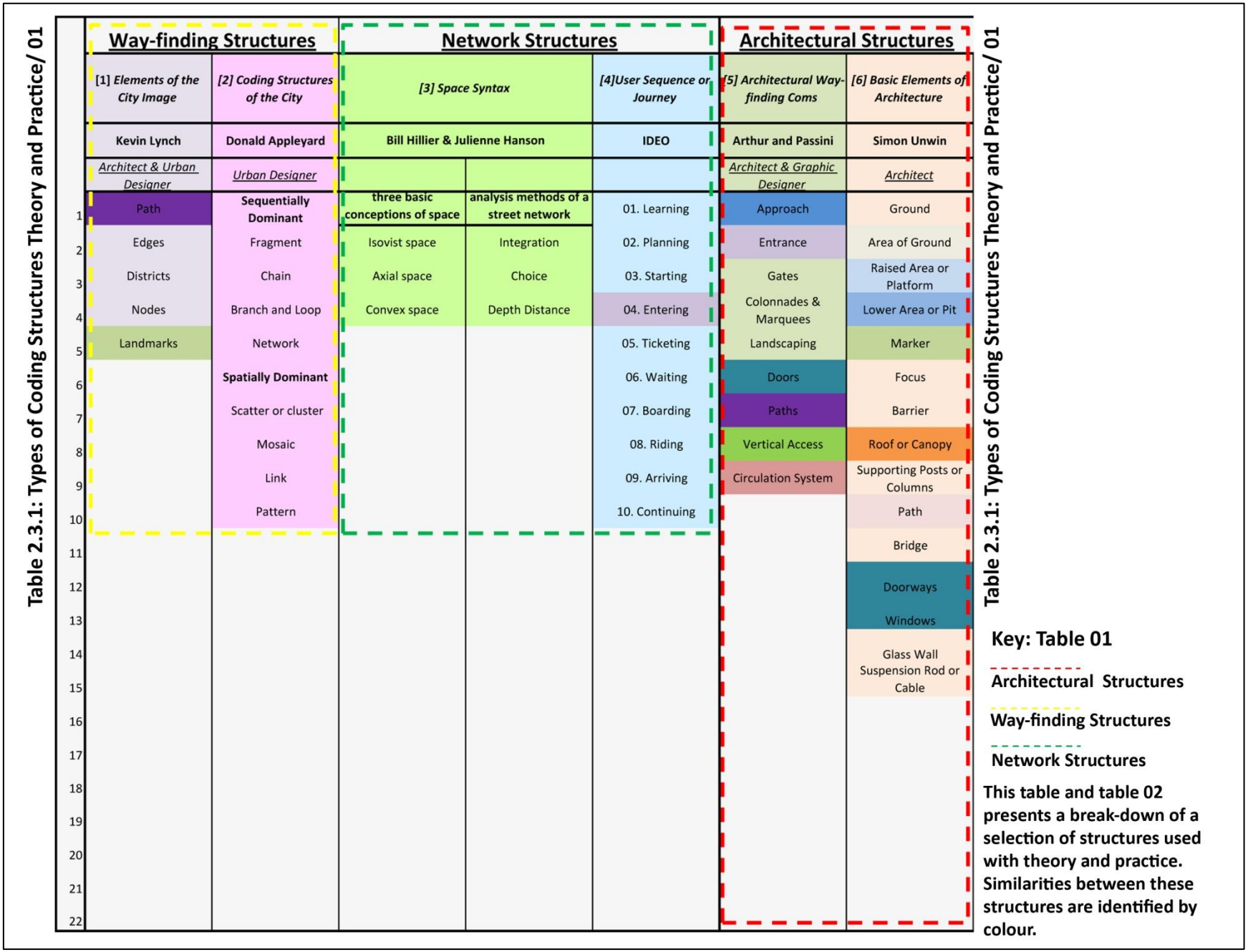


Table 2.3.1: Types of Coding Structures Theory and Practice/01

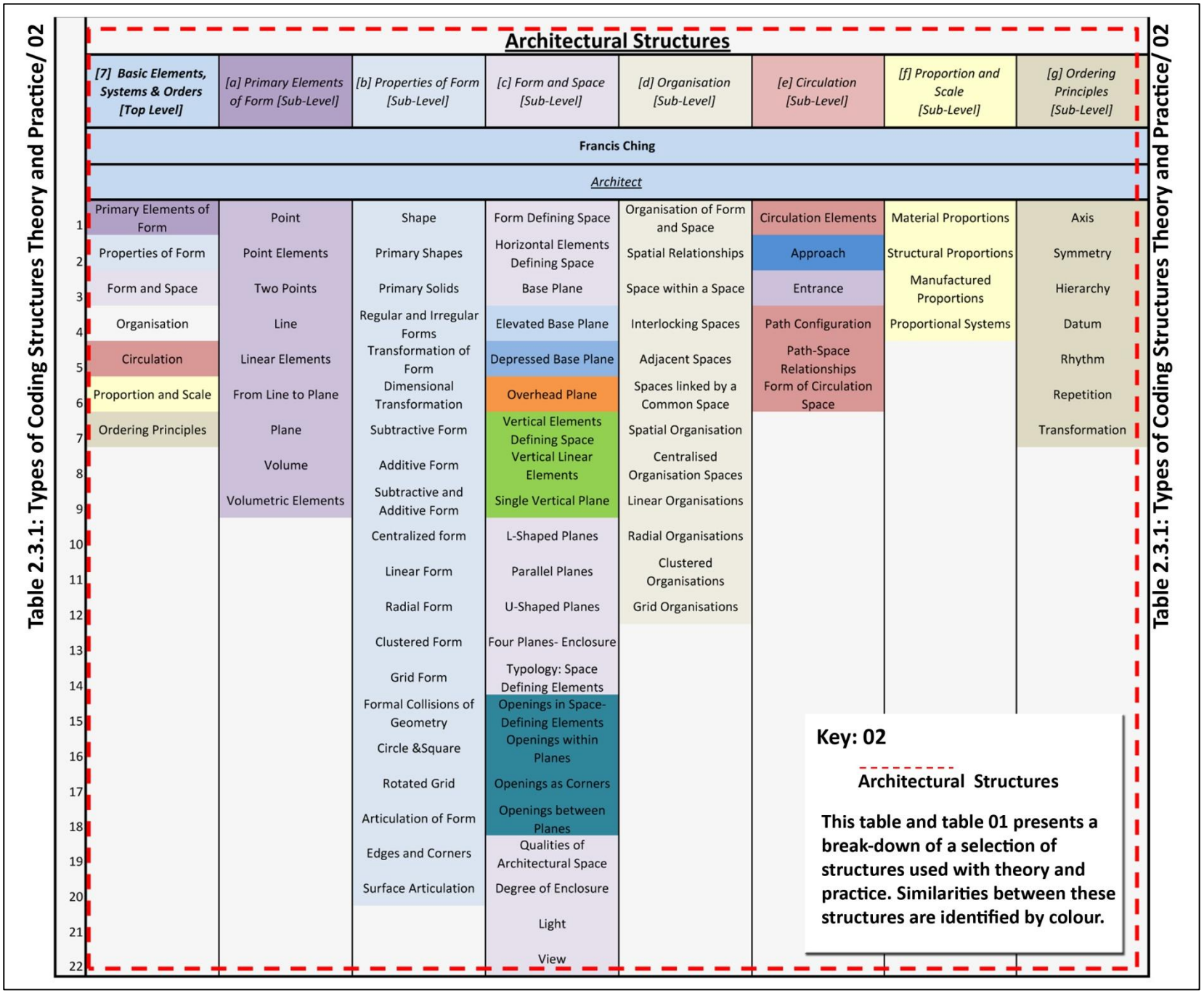


Table 2.3.1: Types of Coding Structures Theory and Practice/02

2.3.4 Review Summary

Review 3 has explored a body of research concerned with human way-finding in the built environment. It has concentrated on understanding how processes of way-finding, [by both people who are sighted and people who are blind], are currently understood. It has answered: *What is Way-finding? How has way-finding been categorised and understood?* and *Who has described aspects of way-finding that are non-visual or partially visual?*

Way-finding is the process of getting from A to B. It is user orientated and is the cognitive, behavioural and strategic task of planning movement (Arthur and Passini, 1992). It is a process composed of four sub-tasks: 1. Orientation, 2. Choosing and planning the route, 3. Keeping on the right track - Navigation, and finally 4. Discovering [and stopping at] the destination (Downs and Stea, 1973c). It is knowing what direction and course of action is needed to reach a destination (Downs and Stea, 1977;Golledge, 1993;Arthur and Passini, 1992). It is a form of goal-directed movement (Arthur and Passini, 1992). An un-successful way-finding task can leave a person 'lost' or disorientated in their surroundings (Golledge, 1999a).

Way-finding is a complex set of cognitive, behavioural and physical processes which are widely debated across disciplines. Familiarity of routes, building type, type of way-finding, information availability and its synthesis, individual's abilities and cognitive processes are all factors impacting on and influencing way-finding.

The psychologists view that Cognitive Mapping is the process which enables way-finding by the 'product' of the cognitive map (Downs and Stea, 1977;Downs and Stea, 1973c) is put into practice by researchers such as Lynch who has investigated ways that people structure their cognitive maps. However, this process of cognitive mapping is doubted by researchers such

as Arthur and Passini (1992) and Ingold (2000) who argue that the skill to way-find is not acknowledged. Instead, Arthur and Passini's Information Processing Model (1992) puts the importance on the informative aspects of way-finding.

While Lynch claims 'Nothing is experienced by itself, but always in relation to its surroundings, the sequences of events leading up to it, the memory of past experiences.' (Lynch, 1960,p. 1), Brambring (Hersh and Johnson, 2008) and Harper and Green (2000) fail to take this into account. Their models focus on an individual journey undertaken by a blind person however do not consider the impact these journeys have on the ability to learn or remember routes. They also fail to consider the complicated varying experiences and spectrum of visual loss which have been outlined in Review 2 of this Chapter.

It is evident from this Review that an extensive body of work has been developed in relation to the way-finding processes of people who are blind, visually impaired [to some extent] and sighted people.

However, there is a lack of a way-finding model which incorporates all types of visual ability which is based on both experience and is in relation to a real-world setting (Kitchin, 1997).

There are few evidence-based studies of way-finding in a building. Furthermore, there are no studies of real-life experiences of way-finding undertaken by real-life Participants with a range of visual ability. This is a significant gap in current knowledge.

The next Review, Review 4/4, will explore the Current Design Strategies which Assist/Enhance Way-finding.

Chapter 2

2.4 Review **4/4**

[A Focused Insight]

Design Approaches to Assist/Enhance Way-finding

'The overall objective should be to design any [product] building or environment in such a way that all people – including people with a visual impairment – can move around as independently and freely as they would like'(Barker et al., 1995,p. 13).

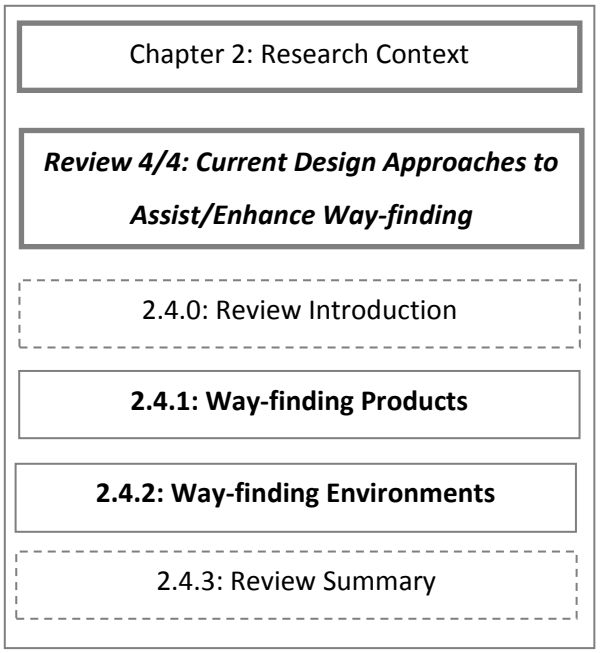


Figure 2.4.0: Review 4 Outline

2.4.0 Review Introduction

This final Review provides a broad, world-wide overview and discussion of products and environments which are used to aid or enhance a person's way-finding in a building.

Whilst acknowledging that there are products and environments designed specifically for way-finding in the external built environment, the objective of this Review is to explore approaches used to assist way-finding within a building. It will discuss a range of precedents but is not intended as an exhaustive review of all way-finding products and environments.

In this Review [outlined in figure 2.4.0] there are two main sections which mirror how the Researcher categorised the Way-finding Approaches.

Section 2.4.1 reviews **Way-finding Products**. The Way-finding Product is defined as the way-finding aids brought into the building by the person [e.g. Cane].

Section 2.4.2 reviews **Way-finding Environments.** The Way-finding Environment is defined as the interventions, tactics, and measures an architect or designer has used as an approach to aid way-finding [e.g. tactile surfaces]. As opposed to being the aids brought into the building by the person, they are the way-finding aids provided to the person by the building.

Within 2.4.1 and 2.4.2 a selection of Way-finding Products and Way-finding Environments will be presented in the form of a Profile Review. Each Profile has a common structure and several components will be identified including: design approach, the designer, key references, project details, primary function [in relation to way-finding] and project images.

Section 2.4.3 **Review Summary,** concludes Review 4 before the full Research Context of this research is concluded within the following section 2.5 *Contextual Review Conclusion.*

Way-finding Products	
Another Person	Hapti Guide
	Cane
iGlasses,	Laser Cane
Guide-Dog	
Palmsonar	Guide Horse
	White Cane
Mini-guide	Seeing Eye Glove
Orientation and Mobility Training	*Vibro-Tactile Orientation And Mobility Unit*
	Seeing Machine
	BAT "K"
Handguide	
	Sound Beacon

Figure 2.4.1: Way-finding Products

[Products highlighted in a deeper colour are now focused on throughout the following Profile Reviews]

2.4.1 Way-finding Products

In this section a selection of Products designed to aid way-finding will be explored. People who have different types of visual ability use different methods of getting around the internal and external built environment. Some people will choose to have a sighted person guide them. Those who have residual visual ability may feel confident to use that alone, whilst others choose to use a form of mobility aid (Baker, 1999).

In addition to orientation and mobility courses [which people with visual loss are encouraged to take part in], there are various forms of mobility aids [figure 2.4.1]. They each have a range of function which include, detecting obstacles, providing orientation and providing navigation.

Commonly used way-finding aids in various countries across the world include the Cane and the Guide-Dog. Another more novel aid, which is in a phase of prototyping, is the Guide Horse from the Guide Horse Foundation (Russell, 2001).

There are also a range of electronic aids which a person can bring into a building to aid their way-finding. These include: iGlasses, Palmsonar, Mini-guide ultrasonic obstacle detector and the Sound Beacon, BAT "K", the Handguide, the laser cane, and the Vibro-Tactile Orientation and Mobility Unit.

The Way-finding Products: Orientation and Mobility Training, Cane, Guide-Dog, Palmsonar, Mini-guide and Sound Beacon will be further explored within the following Profile Reviews.

Approach: *Orientation and Mobility Training*

Figure 2.4.2: Orientation and Mobility Training

(The Royal Society for the Blind, 2011 -a)

Image sourced from: http://www.rsb.org.au/Our_Services/Community_Services/Mobility_Services.aspx

Primary Function: The focus of Orientation and Mobility Training [figure 2.4.2] is to encourage the person with visual loss to develop skills which will then enable them to move with safety, confidence and independence as they navigate through the external environment (Baker, 1999)

During the course people are taught specifically to use their 'residual vision, other sensory input and special travel aids' in order to 'learn the principles for guided and independent travel' (Bernsen, 1996,p. 17) .

The Australian Royal Society for the Blind (The Royal Society for the Blind, 2011 -a) outline the types of Orientation and Mobility Services they provide:

- 'Orientation to the person 's home or workplace environment;
- Orientation to new travel routes, in order to maintain independence or maintain exercise levels;
- Sighted guide techniques to improve confidence when travelling with another person;
- Low vision training to improve the use of the person's remaining vision;
- Training in the use of senses other than vision, particularly the use of touch, hearing and smell, to assist with orientation;
- Assessment and training in the use of different types of white canes;
- Strategies for crossing roads safely;
- Training in the use of electronic aids and way-finding devices; and
- Awareness training for community organisations regarding the needs of people who are blind or vision impaired.'

'without the independence that proper mobility training can provide, visually impaired people can face an isolated and restricted existence'

(Baker, 1999,p. 27).

Approach: ***Guide Dog***

Primary Function: Obstacle Detection and Warning

A Guide-Dog [figure 2.4.3] is trained to guide a visually impaired person through their surroundings by helping them to do two main things: avoid obstacles and provide warning. Both the person and the guide-dog undertake forms of orientation and mobility training. For the dog this starts when he/she is a puppy (The Royal Society for the Blind, 2011 -b;The Guide Dogs for the Blind Association, 2009b).

The Guide-Dog is taught 'how to deal with traffic' and 'judge height and width so that it's owner does not bump their head or shoulder' (The Guide Dogs for the Blind Association, 2009b).

A guide-dog is trained within a building and the external street environment. It is trained to avoid obstacles, use elements of a building such as stairs and lifts, and respond to vocal cues and commands. The dog is house trained and is taught to disobey commands which would put the handler or the dog in danger. It will walk in a straight line until he/she has to avoid an obstacle on the route. It is also trained to stop at kerbs and steps to warn the user that there is a change. The dog can find doors, road crossings and get to know the route to places which are frequently visited by their owner. The owner is always in control and gives commands telling the dog which direction to go.

In addition to aiding with obstacle detection, warning and overall navigation the Guide-Dog can be a source of companionship. A Guide-Dog however, is not suited to everyone who has visual-loss.

'To get a Guide Dog, the user must have good orientation and mobility skills. The guide dogs job is not to find the way, but to guide its master around obstacles or stop in front of them' (Bernsen, 1996,p. 17).

Figure 2.4.3: Guide Dogs

Image sourced from (The Guide Dogs for the Blind Association, 2009a)

Image sourced from(The Royal Society for the Blind, 2011 -b)

'guide dogs are trained to guide their owners around obstructions and to stop at distinct hazards such as changes in levels'

(Baker, 1999,p. 26).

[1] AmbuTech
Symbol Cane

Image sourced from: http://www.rnib.org.uk/shop/Pages/Category.aspx?Category=ambutech_symbol_cane

(Royal National Institute of Blind People, 2011b)

[2] AmbuTech
Guide Cane

Image sourced from: http://www.rnib.org.uk/shop/Pages/Category.aspx?Category=ambutech_reflective_folding_guide_cane

(Royal National Institute of Blind People, 2011a)

[3] AmbuTech
Long Cane

Image sourced from: http://www.rnib.org.uk/shop/Pages/Category.aspx?Category=ambutech_telescopic_long_cane

(Royal National Institute of Blind People, 2011c)

Figure 2.4.4: Canes

Approach: *Cane*

Example: *'AmbuTech Canes'* (Royal National Institute for the Blind, 2011)

Primary Function: Obstacle Detection

The cane [figure 2.4.4] is a hand held device specifically 'used to scan the ground in front of the user, allowing them to detect changes in levels and obstructions.' (Baker, 1999,p. 25). The cane optimises the sense of touch and hearing as the user keeps it in contact with the ground.

There are three types of Cane: [1] The Symbol Cane, which has no other purpose than to inform other people that its owner has a form of visual loss; [2] The Guide Cane, which held diagonally across the body [for protection] is used as a scanning device; and [3] the Long Cane, which does both. There is also the Children Cane which includes types [1], [2] and [3] and come in a range of colours (Royal National Institute of Blind People, 2011d).

There are three different techniques of using a cane: [A] Swinging Technique - the cane is 'swung in an arc in front of the user' (Bernsen, 1996,p. 17), [B] Tapping Technique - two points of the arch are touched (Royal National Institute of Blind People, 2011d), and [C] Sliding Technique - the cane is always in contact with the ground (Bernsen, 1996). The technique favoured by the user will influence their choice of cane (Bernsen, 1996;Royal National Institute of Blind People, 2011d).The user has a choice of Cane. The cane can be used to inform others that the user has a visual loss. It can be used to mark-out surroundings. There is little maintenance with a cane when compared to a Guide-Dog. The cane can detect obstacles within its range, however overhead obstructions and the distance between the user's body and the cane are areas which cannot be marked. The user always has one hand occupied by the cane.

Sound Beacon

Image sourced from: http://www.rnib.org.uk/shop/Pages/Category.aspx?Category=electronic_mobility_aids

(Royal National Institute for the Blind, 2011)

Palmsonar ultrasonic obstacle detector

Image sourced from: http://www.rnib.org.uk/shop/Pages/Category.aspx?Category=electronic_mobility_aids

(Royal National Institute for the Blind, 2011)

Miniguide ultrasonic obstacle detector

Image sourced from: http://www.rnib.org.uk/shop/Pages/Category.aspx?Category=electronic_mobility_aids

Figure 2.4.5: Eco-location

Approach: ***Echo-location***

Example: ***'Sound Beacon', 'Palmsonar' and 'Miniguide'*** [figure 2.4.5]

Primary Function: Obstacle Detection

The *Sound Beacon* obstacle detector can be used in two ways. It can be carried by the user and beeps when an obstacle is sensed, or it can be placed on an obstacle and beeps when it senses that a person is approaching to warn the person that the obstacle is there (Royal National Institute for the Blind, 2011).

The ***Palmsonar*** ultrasonic obstacle detector and the ***Miniguide*** ultrasonic obstacle detector are both handheld devices which are used in addition to a Cane or Guide-Dog. They both vibrate with a range of intensity depending how near or far the user is from an object (Royal National Institute for the Blind, 2011)

These aids use the principle of echolocation. They measure the time of the return path of an emitted ultrasonic beam.

These aids can be used in both the external environment and inside buildings. They extend the Cane protection range in distance and angle. They communicate information about different obstacles to the user either by vibrations or sound codes. The effectiveness of these acoustic aids is dependent on the surroundings and how precise the device is. This can impact on the obstacles which they detect. These aids have to be used along with a Cane or Guide-Dog and this means that both the user's hands are occupied. This could be overwhelming to the user and too much information could be a problem. These aids cannot detect lowered areas such as curbs which is why another form of aid is required.

2.4.1 Discussion: Way-finding Products

The advantages of these aids are that they can provide the user with information about their surroundings and warn them of obstacles which lie in their way. They cater for other senses [e.g. hearing and touch]. They are not limited to a specific surrounding and the user can utilise them in a variety of buildings and also use them within the external environment.

However, they do rely on the person to be able to plan ahead in advance of their way-finding trips. They require the person to purchase them [this can be expensive, especially in terms of the more technological advanced products] and they require different levels of training. Continual advancement makes existing technology obsolete and people are less likely to tolerate products that require extensive training to use.

The technologies which have been profiled only impart partial information about the surroundings and they all require that one of the user's hands be occupied. There is also the possibility that the cane could snap, the guide-dog could become sick or that the echo-location products could break-down.

In the following section Way-finding Environments [the way-finding aid given to the person by the building] will be explored.

2.4.2 Way-finding Environments

To provide an overview of the types of design strategies, used by an architect or designer to aid way-finding within a building, the researcher has created several categories including: Regulation, Touch Signage, Tactile Surfaces, Visual Signage, Acoustic Surfaces, Elements of Scent, Choreographed, Acoustic Signage, Simplified Circulation, Phenomenological and User Experience. These categories are not in a specific order and the list is not exhaustive. Figure 2.4.6 [01 and 02] is a representation of a broad review which has aided the researcher to map the scope of precedents and researchers who are working specifically within these categories.

As indicated in figure 2.4.6 [01 and 02 in a deeper colour] the following Way-finding Environment Profiles are explored: Part M, Tactile Map, the Raynes Rail [in relation to touch signage], the Trail Rail, MTA New York Subway Signage, the Rumble Bridge, Jet Blue Terminal, Raynes Rail [in relation to acoustic signage] the Wall House, Therme Vals, and the Total Passenger Experience.

Environmental Design Approach	Building Regulation/ *Technical Standards*	Touch Signage	Tactile Surfaces	Visual Signage	Acoustic Surfaces	Elements of Scent
Types, Precedents and Researchers		Tactile Paving		Navigation Signs		
	British Standard 8300	***Tactile Map***		Regulation Signs		
	Equality Act 2010*	Braille Signage	**Trail Rail**	Orientation Signs	***Rumble Bridge***	
	Americans with Disabilities Act (ADA) 1990			***MTA New York Subway Signage***		Anna Barbara and Anthony Perliss
	Building Regulations England, Wales & Northern Ireland Part M	***Raynes Rail***		Identification Signs		Sensory Gardens
	Australian Disability Discrimination Act 1992 (ADD)	Audio Tactile Map		Symbol Signage Makaton Signage		
	... others	*... others*	*... others*	*... others*	*... others*	*... others*

Figure 2.4.6: Way-finding Environments/01

[Environments highlighted in a deeper colour are now focused on throughout the following Profile Reviews]

*The Equality Act [EA] (2010)superseded the Disability Discrimination Act [DDA] (1995) [which was originally developed in Britain based on the Americans with Disabilities Act [ADA](Goldsmith, 1997)].

Environmental Design Approach	Choreographed	Acoustic Signage	Simplified Circulation	Phenomenological	User Experience	*... others*
Types, Precedents and Researchers	Stadium Design		***Wall House***	Juhani Pallasma	Digital Media Access Group [DMAG]	
	Jet Blue Airport Terminal at JFK			Joy Monice Malnar Frank Vodvarka	***Total Passenger Experience*** **[IDEO]**	
		Raynes Rail			Helen Hamlyn Centre	
	Yokohama International Port Terminal [Foreign Office Architects]				Interdisciplinary Research Institute [IDRS]	
	Space Syntax			***Therme Vals***	IDeA,	
				Peter Zumthor	Maketools	
	... others	*... others*	*... others*	*... others*	*... others*	*... others*

Figure 2.4.6: Way-finding Environments/02

[Environments highlighted in a deeper colour are now focused on throughout the following Profile Reviews]

The Building Regulations Approved Part M. 2004 Edition

(Office of the Deputy Prime Minister, 2004)

Figure 2.4.7: Approved Document Part M (Access to and Use of Buildings)

Approach: ***Building Regulations/ Technical Standards***

Example: ***Approved Document Part M (Access to and Use of Buildings)*** [figure 2.4.7]

Designer[s]: (Office of the Deputy Prime Minister, 2004)

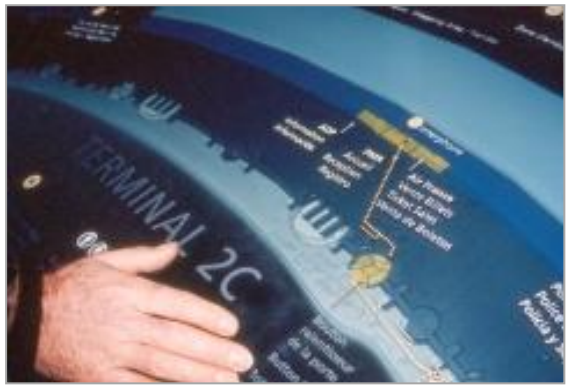
Primary Function: Accessibility and Safety

Government bodies [world-wide] recognised the need to enforce legislation to prevent discrimination against people with disabilities. In England Wales and Northern Ireland, Part M of the Building Regulations requires 'reasonable provision' (Cave, 2007) should be made in terms of access to, and use of a building and its facilities.

'Part M requires the inclusive provision of ease of access to and circulation within all buildings, together with requirements for facilities for disabled people. [...] However, the Part M Approved Document is NOT written as a means of ensuring compliance with these legal duties. It is written to ensure that the design of a building does not create physical barriers to a building's inclusive use, over its lifetime' (Office of the Deputy Prime Minister, 2004).

It is important to clarify that this legislation is not compliance based. It is not a means of ensuring compliance within the legalities of the Equality Act (2010).

The Part M regulations offer the architect guidance. However architects' and designers' moral responsibility and creativity can be compromised due to the 'tick box' nature of the minimum compliance with the guidelines (Britt, 2009;Pullin, 2009). **Therefore, are** 'Rules are more damaging [...] than examples' (Gage, 1980,p. 105)**?**



Charles de Gaulle Airport Paris [2002]

Figure 2.4.8: Touch Signage/Tactile Map

Images sourced from:
http://www.raynesassociates.com/accessibility/category/tactile-maps/ (Coco Raynes Associates Inc)

Approach: *Touch Signage*

Example: *'Tactile Map'* [figure 2.4.8]

Primary Function: Navigation

Designer[s]: Coco Raynes Associates, Inc.

A tactile map can either be on display within a building [or external environment] such as the example by Coco Raynes [left] or it can be carried by a user as they find their way in a building. The detail on a tactile map varies. It is composed of raised graphics, textures, letters and Braille. The surface is raised to enable the user to differentiate between symbols of the map and relate it to areas in the building.

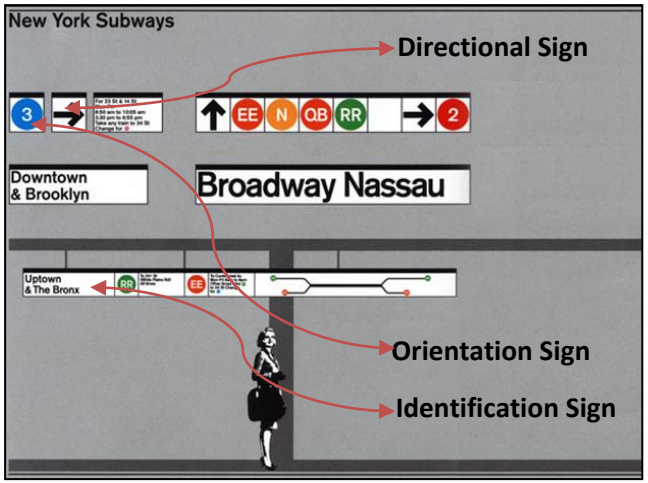
Tufts University School of Dental Medicine, Boston [2009]

W Hotel Boston [2009]

Tactile maps can be used to enable a user to have an overall idea of a building however a weakness is that, 'There is no single international standard for tactile maps'(Bernsen, 1996,p. 53). They lack consistency and different scales and symbols are used from map to map. They can be expensive to produce and many public buildings do not have tactile maps available.

'Tactile maps often lack the information the individual user needs' (Bernsen, 1996,p. 29).

‘Each sign in a system, each separate voice, serves a particular function and displays a specific kind of content called a message, which might include nonverbal graphic symbols,



[1]

[2]

Regulatory or Safety Sign

Figure 2.4.9: Visual Signage

Images sourced from:

[1] (Vignelli Associates), [2] (Metropolitan Transportation Authority, 2011)

Approach: *Visual Signage* [figure 2.4.9]

Primary Function: An individual sign can provide orientation. Two or more signs can provide navigation. A system of signage provides a system of way-finding (Arthur and Passini, 1992).

There are four types of signs (Gibson, 2009,pp 46-55;Arthur and Passini, 1992,p. 147;Royal National Institute for the Blind, 2006): 1. **Orientation** [‘‘You are here indicator’’(Berger, 2005,pp 52-53)], 2. **Directional** [‘cues that users need to keep on the move once they have entered a space’(Berger, 2005,pp 50-51)], 3. **Regulatory** or Safety(Royal National Institute for the Blind, 2006) [‘The dos and don’ts of a place’ (Berger, 2005,pp 54-55) and the demarcation of fire exits (Royal National Institute for the Blind, 2006)]and 4. **Identification** [‘the name and function of a place or space’ (Berger, 2005)].

Example: ‘*MTA New York Sub-Way Signage*’

Designer[s] Vignelli Associates [Massimo and Lella Vignelli] (Shaw, 2008) (Vignelli Associates)

This is a signage system which guides thousands of people through the subway of New York every day. It incorporates text, symbols, diagrams, images and maps.

Signage can be used for various forms of way-finding information [e.g. directional]. It is the most common form of way-finding communication. Signs come in a range of formats [e.g. text, symbols or graphics] and can be used by a wide range of people however the format and layout used can be confusing. It can lack the information the user needs and can be unreliable, inaccurate and illegible (Arthur and Passini, 1992). It can also be affected by glare and obstructions (Arthur and Passini, 1992). Some people struggle to use signage [e.g. visitors who do not speak the language which is represented in the text]. People with less visual ability are not able to use forms of visual signage.

'When gm+ad was looking for literature on this particular building type, it found little on designing for the blind but there was even less on designing for children with dual sensory impairment' (Lewis, 2006,p. 22).

Figure 2.4.10: Tactile Surfaces/Trail Rail

All images sourced from (Lewis, 2006).

Approach: *Tactile Surfaces*

Example: *'Trail Rail'* in Hazelwood School, Glasgow [2007]

Primary Function: Orientation and **Navigation**

Architects: Gordon Murray + Alan Dunlop Architects

Hazelwood School located in Glasgow, caters for children and young people [age 4-18] with multiple physical, sensorial and mental impairments. The school contains eleven classrooms in a single story structure and provides nursery through to secondary education.

'What was clear was that this new building needed to have plenty of visual and tactile clues for the children to use to orientate themselves' (Lewis, 2006,p. 22).

The *Sensory Wall or Trail Rail* [figure 2.4.10] was designed to be both a navigation and orientation aid. The wall is a constant element which weaves through the school's circulation space – 'the street' - and also lets the user know where they are by way of tactile messages.

As an orientation and navigation device it works through the sense of touch. The material cladding on the wall is cork and at various heights, rails have been cut into the wall to encourage the children to independently use it as a 'trailing' device with their hands, canes or feet. The wall is also used as a storage device.

To use the wall as an orientation device the children have to be able to read Braille. There is the potential for children coming from both directions to collide.

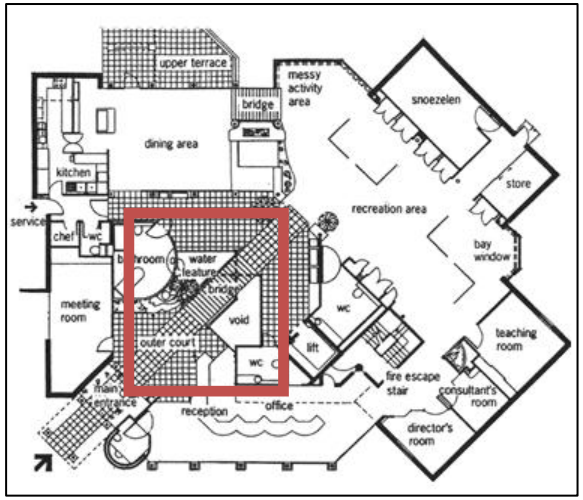


Image above sourced from: (Nicoll Russell Studios)

Approach: ***Acoustic Surfaces***

Example: ***'The Rumble Bridge'*** [figure 2.4.11] in The Whitetop Centre Dundee [1994]

Primary Function: Orientation and Navigation

Architects: Nicoll Russell Studios

The Whitetop Centre, located in Dundee, is a day care facility for young adults with multiple physical, sensorial and mental impairments.

> 'We wanted the building to have an understandable, ordered form, with key features, corner stones and places to establish orientation and familiarity'
>
> (Russell and McHoul, 1994)

[Researchers Photographs]

Figure 2.4.11: Acoustic Surfaces/The Rumble Bridge

The *Rumble Bridge* connects the entrance area with the main part of the building. It rumbles when it is being used and provides an orientation aid to other users of the building.

As an orientation device it works through the sense of sound, however the *Rumble Bridge* has to be used to be activated as a way-finding aid [i.e. a person has to walk across it to make it rumble].

'The Braille and audio information describe the entire floor plan and inform the visitor of what is ahead, such as offices, facilities, departments, elevator banks, and emergency exits, or warns them of physical changes in the corridor pattern, such as turns, ramps, or stairs' (Coco Raynes Associates Inc).

Figure 2.4.12: Touch Signage/Raynes Rail

Images sourced from:
http://www.raynesassociates.com/accessibility/category/tactile-maps/ (Coco Raynes Associates Inc)

Approach: ***Touch Signage***

Similar to visual signage, forms of touch signage include tactile forms of communication which provide information in relation to: the context of a setting, orientation, directional and safety information. The signage is activated by the person touching the intervention.

Example: ***'Raynes Rail'*** [figure 2.4.12] in various locations such as Charles de Gaulle Airport Paris, France.

Primary Function: Orientation and Navigation

Designer[s]: Coco Raynes Associates Inc.

'Coco Raynes Associates, Inc. developed the Raynes Rail to provide the missing link between the entrance of a building and the desired location' (Coco Raynes Associates Inc).

The *'Raynes Rail'* is a handrail that responds through being activated by touch and gives information through audio and/or Braille. Its objective is to guide someone around a building. As an orientation device it works through either touch or hearing [depending on which rail is being used]. The audio handrail responds in three different languages and the Braille handrail can be read by the user as they hold it for stability.

To use the Braille Handrail however the user needs to be able to read Braille. There are a limited number of languages available with the Audio Handrail. At any one time there is a limit to how many users can use both handrails. If the user was not aware that the handrails were there or that they provided information [e.g. if the user was blind and was not able to see the handrail], the information would be missed. It would be important that the messages were updated as the surroundings changed.

Figure 2.4.13: Choreographed Movement/'Egg-Shaped Information Ring'

Images sourced from Photographer: (Lehoux, 2011) http://www.archdaily.com/120889/jetblue-airways-t5-at-jfk-rockwell-group-with-gensler/

Approach: *Choreographed Movement*

Example: *'Egg-Shaped Information Ring'* [figure 2.4.13] in Jet Blue Terminal at John F. Kennedy International Airport, New York [2008]

Primary Function: Navigation

Architect[s]: David Rockwell along with Choreographer Jerry Mitchell. [Rockwell Group with Architects Gensler & Associates].

Architect David Rockwell and Choreographer Jerry Mitchell worked together to create an 'interior experience' in the JFK Airport. Their aim was to be able to choreograph people's movement. Jerry Mitchell stated: "'People move easiest in circles: off and on the merry-go-round' " (Green, 2006).

This intervention incorporates a signage system composed of graphics which are housed in the egg-shaped information ring. There is also terraced seating which the designers describe as part of the 'New York-ness' of features of the city (Henry, 2011)

The information ring holds 40 screens. The information projected from these screens varies and can be updated and controlled by JetBlue (Rockwell Architecture Planning and Design, 2011).

The glowing blue egg-shaped information ring acts as a landmark which draws people towards it. It acts as an orientation device and it displays navigation and directional information which can be updated. However it may be difficult for a user to read - 'Whenever a signface is not perceived by the viewer straight-on, angular distortion occurs, reducing the legibility of letters' (Arthur and Passini, 1992,p. 168).

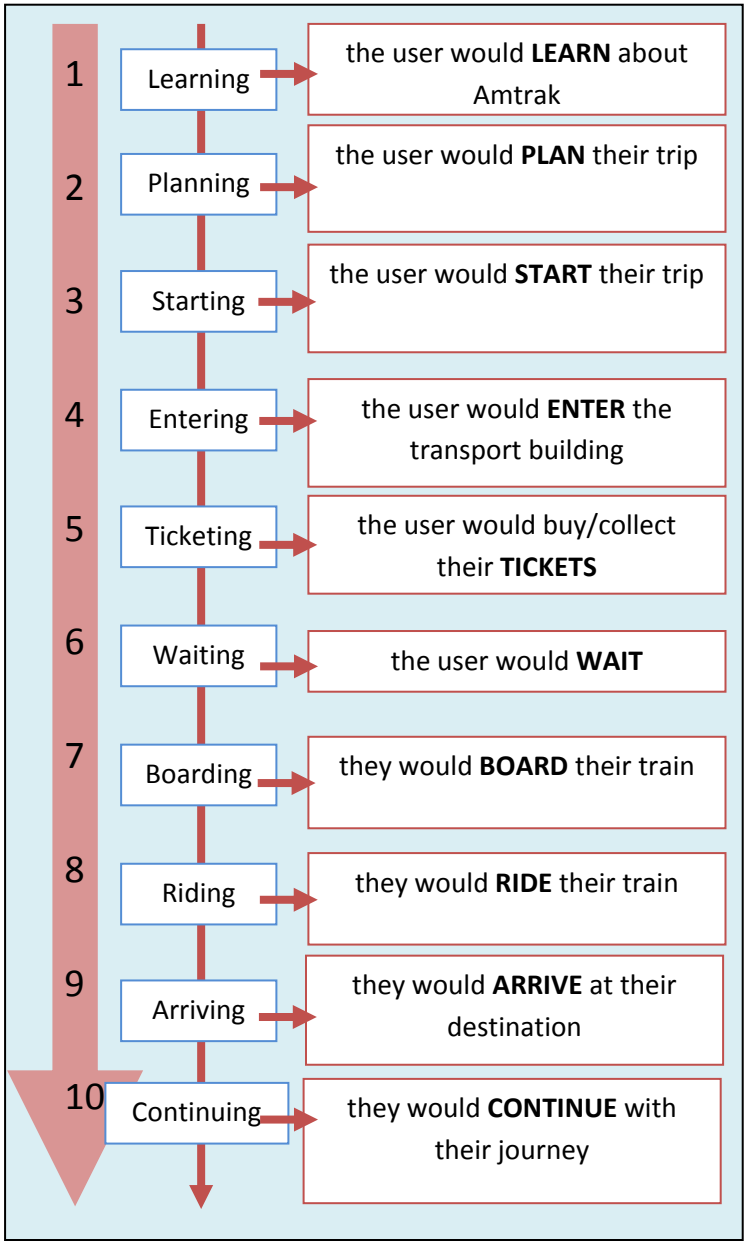


Figure 2.4.14: 'The total passenger experience' (Myerson, 2001,p. 94)

Approach: *User Centred*

User Centred design is an approach of design which is focused on the needs of the end user.

Example: 'The total passenger experience' [figure 2.4.14] of Amtrak high-speed rail service between Boston and Washington [1999] (Myerson, 2001,p. 94).

Primary Function: Understanding the user experience of embarking on a train journey. 'Experience is a dynamic , complex and subjective phenomenon' (Myerson, 2001,p. 89).

Designer[s]: IDEO

When analysing and designing the 'total passenger experience' of Amtrak high-speed rail service between Boston and Washington, IDEO identified there to be ten fundamental steps within a passenger's journey [left].

'Each aspect was developed in relation to the next as part of a seamless experience' (Myerson, 2001,p. 90).

This is a straightforward narrative based on real-life analysis of peoples' experience of travel. This process could be generalised into other transport hubs. It is an experiential narrative of a process which can be translated into a designer's process. There is however, limited ability to deviate or break the sequenced route [e.g. after ticketing the user may want to take part in Planning another journey before Waiting].

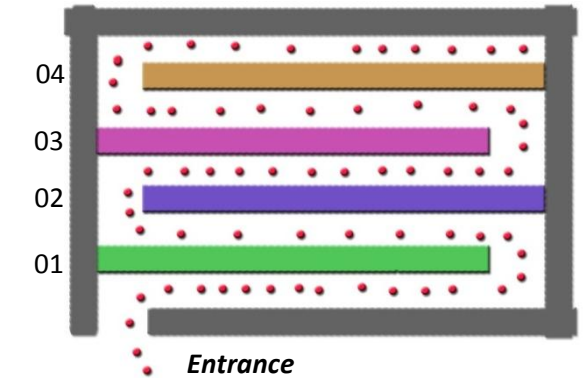


Figure 2.4.15: 'Simplified Circulation – The Wall House

Approach: *Simplified Circulation*

Example: *'The Wall House'* *[figure 2.4.15]*

Primary Function: Navigation

Architect[s]: *Akira Inafugi*

This is an extreme example of *simplified circulation* where the architect has designed a house for someone who is blind (Unwin, 2009). As illustrated [left], the house is essentially a series of walls which are populated with all the elements of a house. The form and content of these walls is illustrated [below, left]. The person follows the wall as they move around their house.

The person can use the walls to navigate, orientate and locate their possessions. They can easily find a place to hang their coat, wash their hands and sit down.

It is however, a misconception that a simple circulation can aid way-finding (Arthur and Passini, 1992) especially in relation to people with visual loss (Barker et al., 1995). Opinion from people with visual loss concluded that 'specialist' buildings were not desired 'when the majority of buildings would never be made more accessible' (Barker et al., 1995,p. 14).

Approach: *Phenomenological*

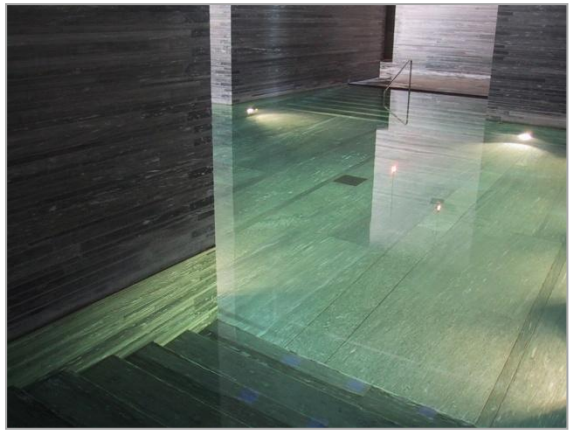


Figure 2.4.16: Phenomenology – Therme Vals

Phenomenology is another design approach which in architecture is focused on the sensorial and material experience of a building. As a research approach it 'focuses on the subjective experience of the individuals studied' (Robson, 2002,p. 195)

In exploring a range of senses of sight, sound, touch and smell and taste Architects (Pallasmaa, 2005;Malnar and Vodvarka, 2004;Blesser and Salter, 2007;Barbara and Perliss, 2006;Zumthor, 2006), are each [at varying degrees] interested in providing and identifying elements of a sensorially rich architecture.

Example: *Therme Vals* *[figure 2.4.16]*

Primary Function: Enhancing Sensorial Experience and Awareness

Architect[s]: Peter Zumthor

The Therme Vals in Switzerland [opened in 1996] is one of Zumthor's most celebrated buildings. It is a significant example of an emphasis of the sensory qualities of architectural experience through considered aspects of materiality and spatial qualities.

> '"Mountain, stone, water – building in the stone, building with the stone, into the mountain, building out of the mountain, being inside the mountain – how can the implications and the sensuality of the association of these words be interpreted, architecturally? Peter Zumthor' (O'Grady, 2009)

This is an example of the holistic sensorial experience being enhanced through architecture.

Images sourced from:
http://www.archdaily.com/13358/the-therme-vals/
(O'Grady, 2009)

2.4.2 Discussion Way-finding Environments

Within this section, a selection of Way-finding Environments which are specifically designed to aid or enhance way-finding are presented in relation to categories of approach [e.g. *Regulation*] have been presented.

Building Regulations/ Technical Standards (particularly Part M of the Building Regulations) are important as they provide the architect or designer with guidance in relation to all aspects of making their buildings accessible and safe. However this legislation is not compliance based and this Researcher questions if the designer's moral responsibility and creativity in relation to disability is compromised due to the 'tick box' nature of the minimum compliance with the guidelines.

There are various strengths and weaknesses of visual signage, touch signage, tactile surfaces, and acoustic signage. They can each project a message to a user regarding forms of orientation, identification, regulatory and navigation information, however there is a lack of standards [particularly in relation to tactile maps (Bernsen, 1996,p. 53)].

There are various interventions designed to aid a way-finder who can read Braille including the 'Raynes Handrail'. However this information could be missed if the person does not realise that the handrail is there. Also the user has to be able to read Braille to understand the content.

Within specialist buildings, such as Hazelwood School and the Whitetop Centre, interventions have been designed to aid with orientation and navigation while an extreme example of navigation was illustrated within the Wall House. In transport hubs such as JetBlue Terminal in JFK, the designer's objective was to choreograph people's movement while IDEO's approach was to focus on translating a narrative of user experience.

Research and design groups such as: IDEO, IDeA, Maketools, the Helen Hamlyn Centre [The Royal College of Art], Digital Media Access Group [University of Dundee], the Interdisciplinary Research Institute [University of Dundee], Inclusive Design for Getting Outdoors [I'DGO][1], the Research Group for Inclusive Environments [RGIE], and the Design for all Foundation, have all recognised a need for designers to adopt a user-centred approach in design.

There are several Architects who are reacting to a problem presented by the visual bias occurring in architecture (Pallasmaa, 2005;Malnar and Vodvarka, 2004;Blesser and Salter, 2007;Barbara and Perliss, 2006;Zumthor, 2006). It is important to state that the argument is not to omit the sense of sight or doubt the relevance of the visual aesthetic. Rather there is a call for a holistic experience of architecture based on a holistic experience of the senses (Pallasmaa, 2005). This approach could be used to enhance the way-finding experience of those with varying degrees of visual ability.

Throughout this review of literature, the Researcher has come across one quote which seems to be fundamental when understanding how *Way-finding Environments* could have a detrimental impact on the person with visual loss:

> 'Too often token planning gestured towards disabled people seems to add cynicism to thoughtlessness: the ramp that provides wheelchair access to an un-negotiable building; the Braille invitation into an environment that, once entered, proves positively hostile to visually impaired people' (Baker, 1999,p. 8).

[1] Consisting of a range of UK based Universities which include academics from: OPENspace Edinburgh College of Art and Herriot-Watt University; WISE -Wellbeing in Sustainable Environments Oxford Institute for Sustainable Development OISD, Oxford Brookes University, and, SURFACE at the University of Salford.

2.4.3 Review Summary

There are many current interventions and aids which aim to help people, both sighted and non-sighted, as they way-find through their surroundings. The objective of this Review was not to review all products and environments, but to present the scope and understanding of current design approaches dealing with aspects of way-finding within a building. It has answered three questions: *Who has designed products, interventions or environments to aid/enhance way-finding within public buildings? How do these aid way-finding? How can these way-finding approaches be categorised?*

The review was divided into two sections, the first section presented Way-finding Products and the second section presented the Way-finding Environments.

However, even with the use of these Products and Environments, people with varying degrees of visual loss are still experiencing problems as they way-find through buildings.

The **Contextual Review Conclusion,** figure 2.2: Chapter 2 Review Summary, figure 2.2 [01 and 02**]**, ties together the summaries of the four Reviews. Presented as a series of four succinct paragraphs, it establishes the full literature context of Chapter 2 and outlines the gap[s] in existing knowledge.

The Chapter which follows – Chapter 3: Methodology and Methods: Research Design - will state the research questions and present the formulation of the Methodology and Methods.

Chapter 2

2.5 Contextual Review

Conclusion

2.5 Chapter 2: Contextual Review Conclusion

Review 1 **The Research Scope** *The Who, What, When and How.*	In Review 1/4 the multi-disciplinary scope of the research field was mapped and the key researchers working within the major research themes of this research were identified. Based on the two major research themes [[1] Way-finding in a building by [2] people who have varying degrees of visual loss], a *Contextual Guide* was established and the problem area was outlined. The built environment is failing to support people who have a form of visual loss (Barker et al., 1995). The task of way-finding within a public building is raised as a particular problem (Barker et al., 1995;Arthur and Passini, 1992). Architecture based on the needs of people who are completely blind is not beneficial or useful to people who have different and varying range of visual ability [or for the rest of society] (Barker et al., 1995). **User involvement is extremely important to uncover and understand the issues of way-finding and visual loss. In addition to the negative experiences there are also positive experiences. A balanced view of experience needs to be considered.**
Review 2 **The Nature of Visual Loss**	In Review 2/4 the nature of visual loss was depicted. The global extent of visual loss makes it a highly relevant condition which needs to be understood. As opposed to being completely blind, various degrees of visual loss impact on a significant number of people. However, the contentious issue of terminology and definition make understanding this range of visual loss a difficult task to grapple with. Under the *Medical Model of Disability*, people who have impairment are disabled. Under the *Social Model of Disability* either able-bodied or impaired people can be socially disabled [although researchers do tend to concentrate their efforts on the impaired population (Goldsmith, 1997)]. **Under the *Architectural Model of Disability* people [regardless of ability or impairment] can be architecturally disabled (Goldsmith, 1997).**

Figure 2.2: Chapter 2 Review Summary/01

2.5 Chapter 2: Contextual Review Conclusion

Review 3 **The Nature of Way-finding**	In Review 3/4 a body of research concerned with human way-finding in the built environment was investigated. It concentrated on understanding how processes of way-finding, [by both people who are sighted and people who are blind], are currently understood. Way-finding is the process of getting from A to B. It is user orientated and is the cognitive, behavioural and strategic task of planning movement (Arthur and Passini, 1992). It is knowing what direction and course of action is needed to reach a destination (Downs and Stea, 1977;Golledge, 1993;Arthur and Passini, 1992). It is a form of goal-directed movement (Arthur and Passini, 1992). An un-successful way-finding task can leave a person 'lost' or disorientated in their surroundings (Golledge, 1999). **There is a lack of a way-finding model which incorporates all types of visual ability which is based on both experience and is in relation to a real-world setting (Kitchin, 1997). There are few evidence-based studies of way-finding in a building. Furthermore, there are no studies of *real-life* experiences of way-finding undertaken by *real-life* Participants with a range of visual ability.**
Review 4 **Design Approaches to Assist/Enhance Way-finding**	There are many current interventions and aids which aim to help people, both sighted and non-sighted, as they way-find through their surroundings. Review 4/4 was divided into two sections, the first presented Way-finding Product Profiles of: Orientation and Mobility Training, Guide-Dogs, Canes and the ultrasonic sensing products: Sound Beacon, Palmsonar and Miniguide. The second presented the Way-finding Environment Profiles of: Part M, Tactile Map, the Raynes Rail, the Trail Rail, MTA New York Subway Signage, the Rumble Bridge, Jet Blue Terminal, Raynes Rail, the Wall House, Therme Vals, and the Total Passenger Experience. **Even with the existence of way-finding Products and Environments, people with varying degrees of visual loss are still experiencing problems as they way-find through buildings.**

Figure 2.2: Chapter 2 Review Summary/02

Chapter 3

Methodology and Methods

Research: The Design

‘Design is concerned with turning research questions into projects’

(Robson, 2002,p. 79)

3.0 Chapter Introduction

Until this point in the thesis a series of research themes have been established and a literature review has defined the scope of this research. In the previous chapter, the research contexts were reviewed and a gap in the current knowledge has been recognised:

There are few evidence-based studies of way-finding in a building. Furthermore, there are no studies of real-life experiences of way-finding undertaken by real-life Participants with a range of visual ability.

A set of research questions have been formulated:

- What are the design issues revealed by Participants who have a range of visual ability as they way-find in a large public building?

- What is an appropriate Methodology and Set of Methods to investigate experiential components of way-finding suited to people with limited visual ability*?*

To answer the research questions and to frame the research enquiry, a period of time was taken to consider the methodological approach. The main objective of this Chapter is to demonstrate the purpose and rationale of the methodology and methods employed by the study.

This Chapter is structured by Six Research Steps [figure 3.0]. Each Step describes the process of developing and testing the Methodology and Methods.

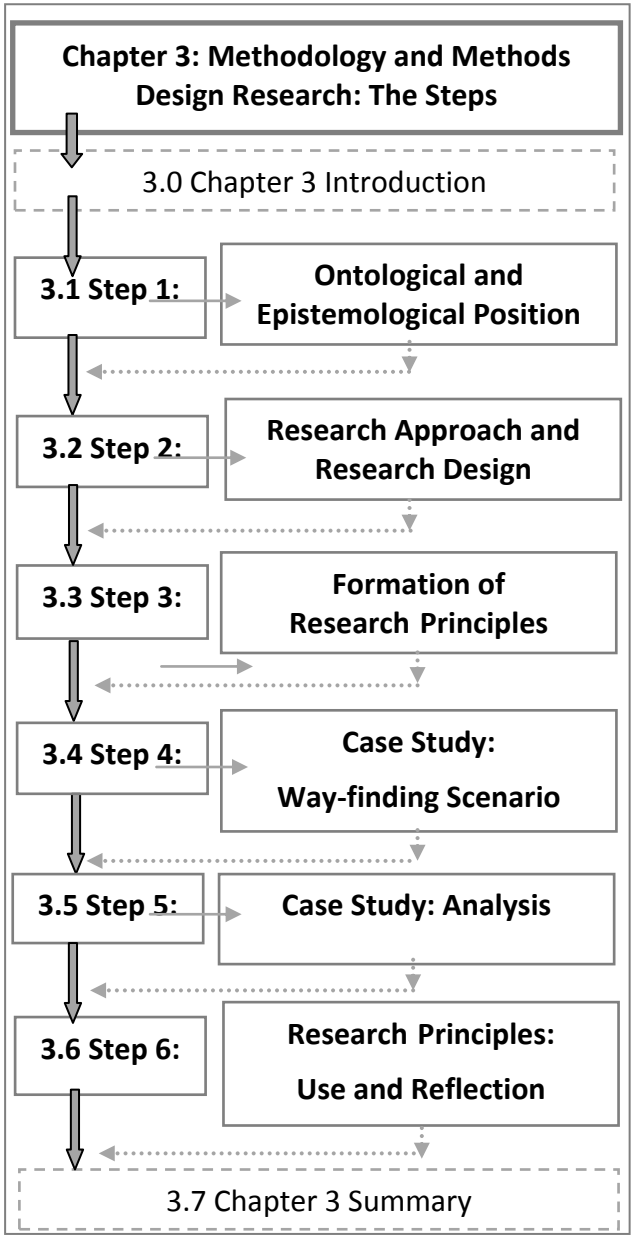


Figure 3.0: The Six Research Steps of Chapter 3

Design Research: The Six Research Steps

Section 3.1 [Step 1] **Ontological and Epistemological Position,** establishes the Researcher's ontological and epistemological position. The research purpose is described and the roles of the Researcher adopting these positions are considered.

Section 3.2 [Step 2] **Research Approach and Research Design,** presents three challenges in regard to: 1. seeking a dominant methodology within the discipline of architecture; 2. selecting a strategy and; 3. selecting an appropriate Research Approach. The foundations of the methodology are introduced by drawing on two established methodologies of Grounded Theory (Glaser, 1968) and Case Study (Yin, 2003a;Yin, 2003b). Elements from both, [along with other approaches used in research and practice] are taken forward to create Research Principles.

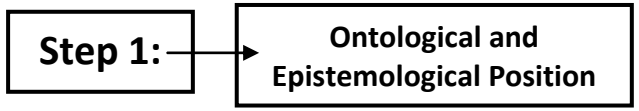
Section 3.3 [Step 3] **Formation of Research Principles,** establishes the research rationale and theoretical framework for this research study. A series of Research Principles are defined and these provide the foundation to guide this study.

Section 3.4 [Step 4] **Case Study: Way-finding Scenario,** presents the evolution of the Case Study: A Way-finding Scenario.

Section 3.5 [Step 5] **Case Study: Analysis,** demonstrates how the Way-finding Scenario was analysed.

Section 3.6 [Step 6] **Research Principles: Use and Reflection,** reviews and reflects on how the Research Principles were embodied by the study.

Section 3.7 Chapter 3 Summary, concludes this Chapter with a summary before Chapter 4 is introduced.



In the Exploratory Role

- 'To find out what is happening, particularly in little-understood situations
- To seek new insights
- To ask questions
- To assess phenomena in a new light
- To generate ideas and hypotheses for future research
- [To work] Almost exclusively of flexible design'

(Robson, 2002,p. 59)

In the Descriptive Role

- 'To portray an accurate profile of persons, events or situations.
- Requires extensive previous knowledge of the situation etc. to be researched or described, so that you know appropriate aspects on which to gather information.
- May be of flexible and/or fixed design'

(Robson, 2002,p. 59)

Figure 3.1: The Roles of the Researcher

3.1 Step 1: Ontological and Epistemological Position

'Ontology is the starting point of all research, after which ones epistemological and methodological positions logically follow' (Grix, 2002,p. 177).

The fundamental elements of the research study [i.e. the methodology selected, design of the research, methods employed, data collected and analysis] all hinged on the research paradigm of the Researcher (Wisker, 2007). It was from taking this first theoretical step that the research to uncover the new knowledge in regard to the Research Themes progressed.

Grix (2002) argues for a clear distinction to be made between the Ontology and Epistemology position of research in stating that 'ontology is about what we may know, then epistemology is about how we come to know what we know' (p. 177). This Researcher's approach is grounded within the ontological perspective of constructivism [as opposed to objectivism]. It is based on the philosophical concept that through reflecting on experiences, understanding is constructed and made sense of.

The purpose of this research was to generate theory in a less-studied area in architecture, instead of being a verification of a pre-established theory. Therefore, this study is principally exploratory in purpose, however as Robson (2002) suggests 'A particular study may be concerned with more than one purpose'(p. 58), this study is also descriptive. In addition to exploring it will 'portray an accurate profile of persons, personas, events or situations'(p. 59).

The Researcher, although based within the discipline of Architecture, has worked in a multi-disciplinary way. As a sole Researcher, she has established various roles for herself to guide the research. These roles, drawn from Robson's (2002) 'purposes of enquiry' are demonstrated in figure 3.1 and will be further explained throughout this Chapter.

Positivistic Paradigm	***Post-Positivistic Paradigm***
Concerned with hypothesis testing	*Concerned with generating theories*
Using large samples	*Uses small samples*
Data are highly specific and precise	*Data are [sic] rich and subjective*
Produces Quantitative Data	*Produces Qualitative Data*
High reliability	*Reliability is low*
Low validity	*Validity is high*
Generalises from sample to population	*Generalises from one setting to another*

Figure 3.2: Wisker's Summarised Characteristics of Positivistic and Post-Positivistic Paradigms (2007,p. 68)

As opposed to a quantitative line of enquiry, this study is qualitative – it is interested in the qualities. It seeks to explore: 1. human experience of way-finding within the context of a building, 2. 'how people in real world situations "make sense" of their environment and themselves'; and the 3. the 'role of interpretation in the collection and presentation of data' (Groat and Wang, 2002,p. 179).

Wisker (2007) summarised characteristics of the two major theories of epistemology [figure 3.2], the Positivistic Paradigm and the Post-positivistic Paradigm.

This architectural research, positioned within the Post-Positivistic Paradigm is inductive rather than deductive. It is concerned with generating theories as opposed to testing a pre-conceived hypothesis. It employs a 'scientific attitude' (Robson, 2002,p. 18) as it applies and tests methodology, method, research principles, analysis and ethics in a progressive way.

The objective, through continuous iteration, is to develop a new theorisation of way-finding which is based on the Participants' experiences. It allows for a flexible design of enquiry and encourages iteration and fine-tuning throughout the research process (Groat and Wang, 2002). The objective is to focus on experiential, qualitative components of way-finding data provided by Participants who are the users - the way-finders - of the setting.

The Researcher was also fully aware of the weaknesses of this approach. Throughout the research, factors including: a lack of sequential phases, dealing with substantial amounts of data, and the problems associated with ensuring that data is credible (Groat and Wang, 2002), were addressed through the selection of methodology and methods.

Fixed design strategy	Flexible design strategy
Pre-specified Design	Design evolves during data collection
Mostly quantitative data [numerical] Rarely qualitative data [words]	Mostly qualitative data [words] Rarely quantitative data [numerical]

Figure 3.3: Robson's (2002) Description of Fixed and Flexible Design Strategies

3.2 Step 2: Research Approach and Research Design

It was crucial that the methodology and research methods were selected in relation to the ontological and epistemological positions. It was also essential that they would enable the Researcher to engage with, and answer, the research question[s] when considering and addressing the gap in the knowledge.

What is an appropriate Methodology and Set of Methods to investigate experiential components of way-finding suited to people with limited visual ability?

When investigating within the 'domain of architectural research' (Groat and Wang, 2002,p. 19) the Researcher found there to be a specific lack of dominant post-positivistic methodology. This was the first challenge which resulted in methodologies and methods being adopted from the realm of social research. The Researcher's existing experience of working with impairment charity user-groups alongside tacit skills gained from architectural education, training, and professional experience, were also drawn upon.

The second challenge was to select a Research Design Strategy. Robson (2002) outlines two Design Strategies: Fixed or Flexible, which are summarised by the Researcher in figure 3.3. The Flexible route of investigation was deemed best appropriate for this research as it asked '"What" questions concerned with "what is going on here?"' (Robson, 2002,p. 91). This research asks:

What are the design issues revealed by Participants who have a range of visual ability as they way-find in a large public building?

Robson (2002) explains that the Researcher following the route of fixed design has knowledge of what he/she is seeking. This Researcher was not in this position. The flexible design strategy enabled the design of enquiry along with the data analysis to, through

iteration, evolve to develop a new theory. It allowed the research to be inductive and rigorous whilst being flexible enough to deal with the implications and uncertainty of data.

Developing the Research Approach within the Flexible Design Strategy

The third challenge was to decide on and develop an appropriate Research Approach.

To ensure the Researcher had a grasp on different types of research approaches, Evaluation Research and Action Research [methodologies often utilised by designers (Swann, 2002) and used in social sciences (Lewin, 1946)] were investigated. Within the flexible design strategy, Case Study, Ethnographic Study, Grounded Theory, Phenomenological Research, were fully considered.

There was not one holistic methodological approach within the flexible design strategy which would fully meet the demands of this study. Instead a combination of principles borrowed from the established approaches of Grounded Theory [originally introduced by Glaser and Strauss in 1967 (Wisker, 2007)] and Case Study (Yin, 2003a;Yin, 2003b) were adopted.

These borrowed principles evolved into a series of *Research Principles* which became the manifesto of this Research. Through the use of ethnographic methods a new method, appropriate to this study [and to the discipline of architectural design], was designed and tested. The characteristics of Grounded Theory and Case Study will now be described.

Grounded Theory

Within social sciences, Grounded Theory is said to be 'particularly useful in new, applied areas where there is a lack of theory and concepts to describe and explain what is going on' (Robson, 2002,p. 90). Grounded Theorists generally believe that research questions,

concepts and themes should guide a research study as opposed to a hypothesis (Strauss and Corbin, 1990).

Although there is limited application of Grounded Theory in the field of architectural research, it has been utilised by other design disciplines [such as interactive computing (Le Dantec and Do, 2009) and multimedia design (Linden and Cybulski, 2003)].

Originally founded in the discipline of Sociology in order to 'provide a thorough theoretical explanation of social phenomena under study' (Corbin and Strauss, 1990,p. 5), Grounded Theory, [in this architectural research] was used to develop a theoretical description of user phenomena. It provided a way to uncover data based on experiential components of way-finding – 'insider experience, privileged insights and experiences' (Wisker, 2007,p. 213) – and enabled the research to remain open. Inductive in nature, Grounded Theory is focused on work carried out within the field. It is vastly different from the more traditional line of enquiry where all data is firstly gathered and then all analysed. Instead the process is highly iterative, data is gathered from the first source and it is analysed before data is collected from the second source. This process is repeated [i.e. data collection, data analysis, data collection, data analysis] until data saturation is achieved (Robson, 2002).

Throughout analysis, categories and codes are formed based on the data and a saturation point is reached when categories can no longer be added to. However, deciding when this saturation point has been reached is a challenge (Robson, 2002).

There are other requirements of the Researcher adopting Grounded Theory. A mindset of 'theoretical sensitivity' (Glaser, 1968) had to be adopted in order that the Researcher be open throughout the interpretive process.

'unions and procedures of Grounded Theory' **Corbin and Strauss's (1990)**
1.Data Collection and Analysis are Interrelated Processes
2.Concepts are the Basic Units of Analysis
3.Categories Must Be Developed and Related
4.Sampling in Grounded Theory Proceeds on Theoretical Grounds
5.Analysis Makes use of Constant Comparisons
6.Patterns and Variations Must Be Accounted For
7.Process Must Be Built into the Theory
8.Writing Theoretical Memos Is an Integral Part of Doing Grounded Research
9.Hypotheses About Relationships among Categories Should be Developed and Verified as Much as Possible during the Research Process
10.A Grounded Theorist Need not Work Alone
11.Broader Structural Conditions Must be Analysed, However Microscopic the research.

Figure 3.4: Corbin and Strauss's* (1990) *Procedures of Grounded Theory

The Researcher had to have 'the attribute of having insight, the ability to give meaning to data' (Strauss and Corbin, 1990,p. 42). This trait is believed to come from sources such as life experiences [both personal and professional] as well as from being immersed in literature (Strauss and Corbin, 1990). It was the way in which new concepts and theoretical understanding could emerge from the data (Glaser, 1968).

Although Grounded Theory enables a degree of 'procedural flexibility', a set of prescript procedures 'unions and procedures of Grounded Theory' [figure 3.4] make it, in terms of this research, restrictive. Due to the nature of the disciplinary difference, [i.e. between Architecture and Social Sciences] and the particular focus of this research, certain principles of Grounded Theory were adhered to [e.g. the element of evolving design which allowed for discovery whilst data was continually collected and analysed] while some were not. This selection process is expanded on further within Step 3: Formulation of the Research Principles.

In addition to the use of Grounded Theory as the interpretive paradigm of qualitative research, the strategy of Case Study (Yin, 2003b), was also utilised in this research. The role of Case Study will now be considered.

Case Study

'In one sense, all enquiries are case studies. They take place at particular times in particular places with particular people' (Robson, 2002).

Case Study is an approach often used within Architecture (Groat and Wang, 2002). Within teaching in design studio and in professional practice it is especially useful in providing a strategy to study, explain and analyse, 'individuals, buildings, episodes, institutions, processes, societies' (Zeisel, 1984,p. 65).

Imrie and Hall (2001) and the Centre for Accessible Environments publication 'Access by Design' [edited by Madeline Gray] are specific examples where case studies have, and are still being used to explore inclusive design and accessibility in architectural environments.

Lee, Bichard and Coleman adopt the use of Case Study when exploring user involvement within the design process (Lee et al., 2008) and Sight-loss Charities such as Guide Dogs for the Blind, the Royal National Institute for Blind people and The Dog Rose Trust also adopt a strategy of Case Study when researching with users within the external built environment.

As opposed to being a method, Robson (2002,p. 179) states that Case Study is *'a strategy'*, as it is procedure rather than a technique [e.g. questionnaire]. Case studies are generally used in the pursuit to answer research queries of 'how' and 'why' (Yin, 2003b,p. 1). They are often reliant on multiple methods to explore a phenomenon (Robson, 2002).

Yin (2003b) explains that case studies are best utilised if the Researcher: does not know what to expect, is focused within a real-life setting and utilises different types of data. The flexible nature of the Case Study enables the research to remain centred around investigation of real-life events.

Based around a specific phenomena, the use of Case Study enables a line of enquiry to develop which is focused, as opposed to being generally positioned within a larger context (Robson, 2002). Although Robson highlights the freedom of using Case Study [i.e. 'The case can be virtually anything' (2002,p. 180)], the Researcher is also aware that is can be identified as a weakness (Zeisel, 1984).

Case Studies, like Grounded Theory also come with a warning: 'Even with good faith and intentions, biased and selective accounts can undoubtedly emerge' (Robson, 2002,p. 181). Although this is the case within any form of research (Robson, 2002), the role of the

Researcher in this instance is to remain aware of this issue and to ensure measures were taken in establishing the credibility of the research. In order to overcome the lack of sequential phases (Groat and Wang, 2002) associated with the Researcher's Position [outlined in Step 1], guidance, in the form of Research Principles, was taken to design the Case Study.

These Research Principles, which shaped and structured the design of the enquiry, will now be considered.

3.3 Step 3: Formation of the Research Principles [The Framework]

'The plan contains details of the data collection, procedures to be used,

and the general rules to be followed' (Robson, 2002,p. 183)

The plan for this research was an evolving process and as established previously, it was not a linear process. There were however, several constant activities: reviewing literature, undertaking case studies, data collecting, data analysing, reflecting on the process and disseminating.

A framework to guide and make decisions regarding the research design [1. subject and setting, 2. process and analysis, and 3. evaluation and rigour] will now be discussed by way of Research Principles which are outlined in figure 3.5. As previously established, elements of this model were drawn from both Grounded Theory (Glaser, 1968) and Case Study (Yin, 2003a;Yin, 2003b) as well as from other sources of research and practice.

These Research Principles [described below] provide the manifesto of this Research.

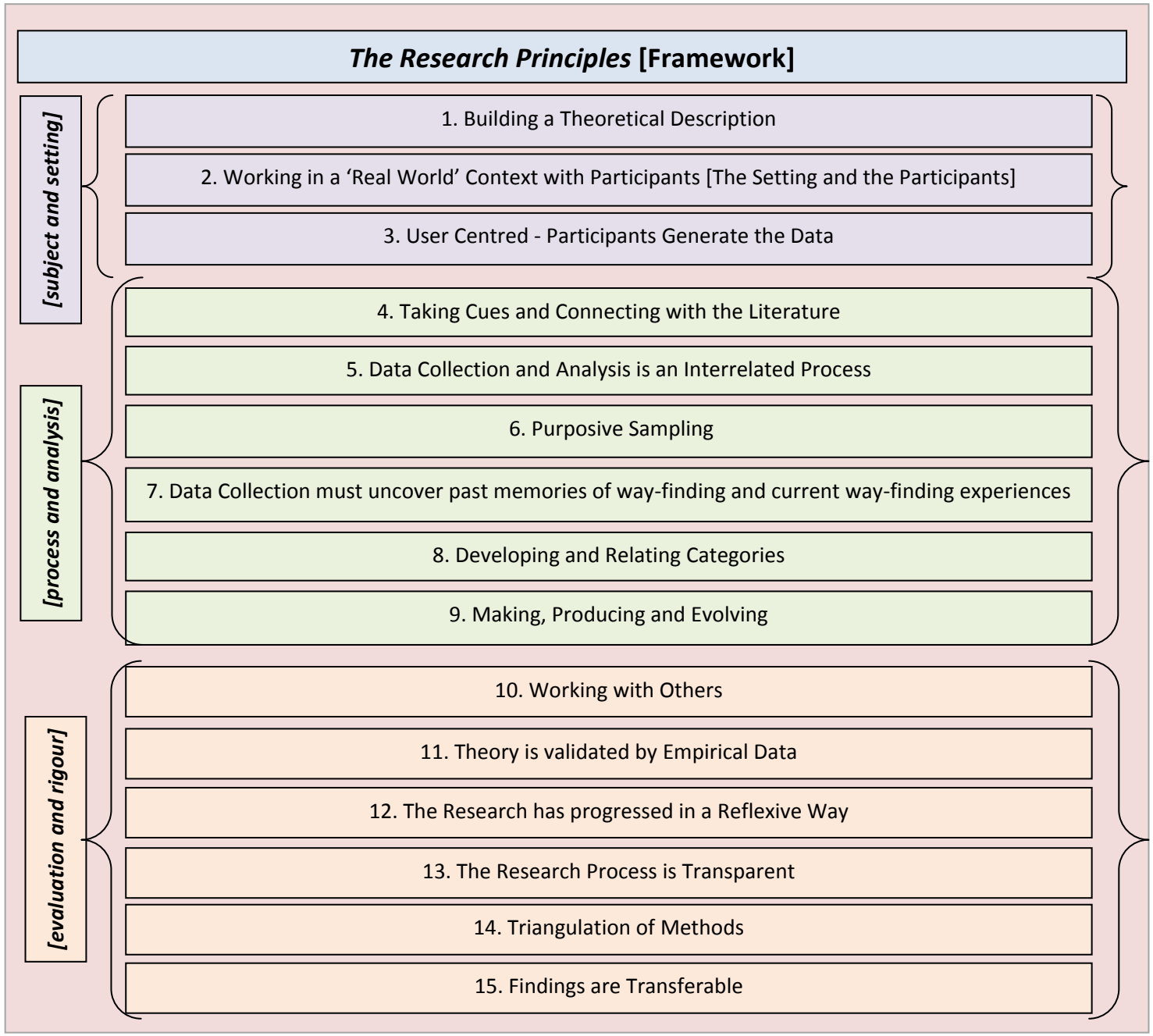


Figure 3.5: The Research Principles – The Manifesto of this Research

1. Building a Theoretical Description

Research begins with a situation to investigate [as opposed to a hypothesis to test]. Questions and themes fuel the pursuit to generate theoretical description. This is a key element of Grounded Theory which positively encourages the uncovering of theory from data (Corbin and Strauss, 1990).

Research ends with a theoretical description generated from activity of collection, collation and analysis of data.

2. Working in a 'Real World' Context with Participants

The Setting

Robson identifies that there are two alternative ways to conduct research: 1. in a laboratory environment or, 2. in a real-life context (Robson, 2002).

Research which takes place in a real-life setting is preferred by Robson. The Researcher can explore *'what is actually going on – what elements, relationships, and dynamics are salient'* (Zeisel, 1984,p. 72). Zeisel (1984) explains that a phenomena cannot be holistically investigated if elements of the context are missing. When a situation is re-created in a laboratory environment elements are excluded.

The Participants

There are two ways to conduct research which investigates disability and impairment: 1. simulations where conditions of disability and impairment are simulated on non-disabled people [via 'capability simulators'(i~design, 2010)] or, 2. where people who have forms of disability or impairment take part.

Research which puts user experience as the focus is preferred as the use of simulations on non-disabled people are often put into question by Researchers such as Davis and Lifchez (1987) as they fail to give a true account of what it is like to have a disability or impairment. The Researcher working with people who have a form of disability or impairment must be aware and understand the Models of Disability [as described in Chapter 2: Review 2] and Ethical Implications.

3. User Centred - Participants Generate Data

Research and design groups such as: IDEO, IDeA, Maketools, the Helen Hamlyn Centre [based in the Royal College of Art], Inclusive Design for Getting Outdoors [I'DGO][1], the Research Group for Inclusive Environments [RGIE], and the Design for all Foundation, have all recognised a need for designers to adopt a user-centred approach in design. Protocols [regarding Ethical Procedures and Data Protection] need to be considered, understood and adhered to when working with users, especially those users considered vulnerable. Lee, Bichard and Coleman consider this to be one of the stages of 'user involvement tactics' and term it as a stage of, 'Engaging – obtaining informed consent, incentive and confidentiality' (Lee et al., 2008,p. 8).

Summary: Subject and Setting

The Principles of Subject and Setting [1-3] were based on the philosophical concept that through reflecting on experiences, understanding is constructed and made sense of (Grix, 2002). The Principles of Process and Analysis will now be considered.

[1] Consisting of a range of UK based Universities which include academics from: OPENspace Edinburgh College of Art and Herriot-Watt University; WISE -Wellbeing in Sustainable Environments Oxford Institute for Sustainable Development OISD, Oxford Brookes University, and, SURFACE at the University of Salford.

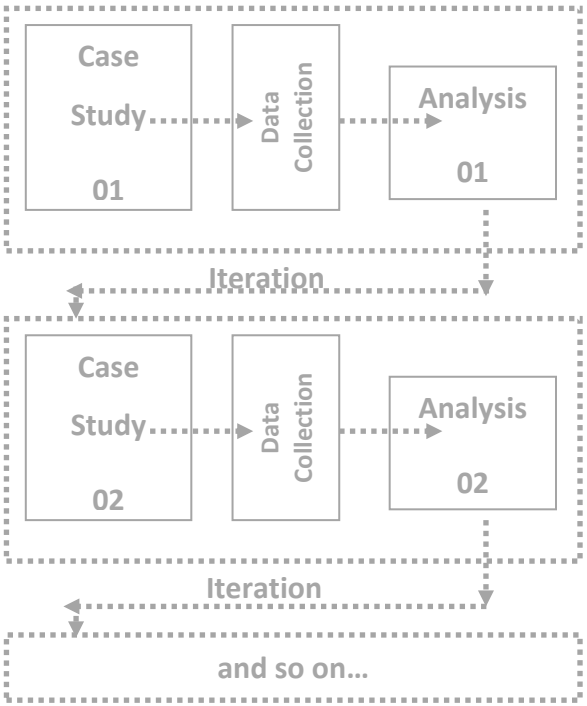


Figure 3.6: The Iterative Case Study

4. Taking Cues and Connecting with the Literature

The literature review is one of the key components of carrying out a PhD study (Phillips and Pugh, 2005;Wisker, 2007). It is where the Researcher establishes and reviews the context of the study. It is the engagement with the field and confirms the gap in existing knowledge (Wisker, 2007). The literature review is not only an activity carried out at the beginning of a research study, it is a constant activity which underpins the research.

Strauss and Corbin (1990,pp 50-53) suggest that the literature can be utilised to do five things:

- stimulate theoretical sensitivity
- be a secondary source of data
- simulate questions
- direct theoretical sampling
- be a source of supplementary validation

Glaser (1968), however, highlights that literature can also impact negatively on the grounded theorist. It can influence how 'freely' the codes emerge from the data. He states that it is important to read widely to avoid memos becoming forced and constrained.

5. Data Collection and Analysis is an Interrelated Process

As opposed to gathering all data, transcribing it and then analysing it [which is generally the structure of research] the fundamental element of this principle is that as soon as data is generated it is transcribed and then analysed [figure 3.6]. This enables the Researcher to understand, develop method and collate the data as it is produced (Corbin and Strauss,

1990). Data generation, transcribing and analysing are sequential components. This is a key principle within Grounded Theory (Glaser, 1968).

6. Purposive Sampling

Purposeful sampling selects information-rich cases for in-depth study (Robson, 2002). The initial sample is selected based on what the Researcher wants to find out. From this, the next sample and the next [and so on] are selected based on the aim to strengthen and also challenge the emerging codes and theory. In using grounded theory methodology the sample is emergent and the assumption is that the theory is concealed in the data to be discovered (Corbin and Strauss, 1990). This principle highlights the importance of the Researcher as the 'driver' to constantly remain connected with the data and make decisions based on emerging concepts.

7. Data Collection must work to uncover way-finding experiences

In order to explore the research questions different methods of data collection can be utilised when using Grounded Theory (Corbin and Strauss, 1990). In fact Robson (2002) encourages a multi-method enquiry. Interpretive-based multi-method investigation forms a major part of this principle and will provide data relating to collection of experiences, thoughts, forms and extents of contextual interaction.

Methods are selected to suit both the Researcher and the Participants. Special attention needs to be paid to this principle as the methods need to be 'useable' by people with varying degrees of visual ability. It may be difficult, in terms of time and cost, to use questionnaires or any form of written method as the Participants have different information format needs [e.g. Braille, Audio]. The method of data collation and analysis could be more difficult if the data source comes from different formats.

Coding Type	*Summarised Definition*
Open Coding	*concerned with identifying, naming, categorising and describing phenomena found in the text*
Axial Coding	*the process of relating codes (categories and properties) to each other*
Selective Coding	*is the process of choosing one category to be the core category, and relating all other categories to that category.*

Figure 3.7: Types of Coding (Corbin and Strauss, 1990)

8. Analysis: Coding and Categories emerge from the Data

This principle is derived from both Grounded Theory and Case Study. Yin (2003a) states: 'Reliance on theoretical concepts to guide the design and data collection for case studies remains one of the most important strategies for completing successful case studies' (p. 3)

Using this principle, data is constantly compared and each set of data is coded as soon as it is produced. Through the process of coding, theory emerges. As the data collection and coding proceeds, the codes and the memos and diagrams accumulate. Throughout analysis data is continuously put through a process of coding which, defined by Corbin and Strauss (1990), is summarised by the Researcher in figure 3.7.

9. Making, Producing and Evolving: Theoretical Memos

'Since the analyst cannot keep track of all the categories, properties, hypotheses, and generative questions that evolve from the analytical process, there must be a system for doing so' (Corbin and Strauss, 1990,p. 10).

As a fundamental principle of Grounded Theory 'Writing Theoretical Memos Is an Integral Part of Doing Grounded Research' (Corbin and Strauss, 1990). As soon as data is gathered the first set of memos are developed. It ensures that the Researcher is able to deal with and record the developing nature of the codes.

This is a continuous activity and it is advised that coding should be interrupted to write memos based on new concepts. It is also vital that relationships from theoretical memos are related to other data. This allows for verification.

Summary: Process and Analysis

The principles of *Process and Analysis* [4-9] were based on concepts of emergence in the field, iteration and recording and reflecting. They adhere to several of the fundamental elements of Grounded Theory and Case Study as well as current methods of research and practice.

Different from quantitative research, the challenge to assess qualitative research is debated (Robson, 2002;Wisker, 2007;Corbin and Strauss, 1990). There is no simple and exact solution to limit the occurrence of errors in qualitative research however criteria and tests can be applied/ carried out. The Principles of *Evaluation and Rigour* will now be considered.

Evaluation and Rigour

10. Working with Others

'A Grounded Theorist Need not Work Alone' (Corbin and Strauss, 1990).

Corbin and Strauss (1990) suggest that as a measure to prevent a prejudice, the Researcher's analysis should always be critiqued by others. This they state, aids in challenging the codes, categories and relationships, provides fresh contributions, as well as increasing 'theoretical sensitivity' (Glaser, 1968).

11. Theory is validated by empirical data

This principle is concerned with building an evidence base. Theory is validated by empirical data and evidence base is built up and, through the procedures outlined within *Process and Analysis,* a theory is constructed. The theory was based on the data.

In his biographical research Curtin (2005) claims that because the empirical data was a reflection of the Participants' voices, that this aided in the 'integrity', 'credibility' and 'trustworthiness' of his study.

12. The research is progressed in a reflexive way

'Reflexivity in qualitative research – where Researchers turn a critical gaze towards themselves' (Finlay and Gough, 2003,p. 3).

In adopting a reflexive mindset, the Researcher is able to take a step back and critically assess awareness, preconceptions and decisions made throughout the research process. There is also a response to reflexivity – the study and the Researcher changes in response to the reflection and throughout the Principles of Subject and Setting and Process and Analysis.

Personal experiences will always influence how a study progresses. The sole Researcher needs to be aware of this and where possible put measures in place to be tested and challenged on decisions which have been made.

13. The research process is transparent

'Researchers using grounded theory procedures should discuss their procedural operations, even if briefly' (Corbin and Strauss, 1990,p. 20)

In providing all the details in regard to how the research was carried out the Researcher is enabling others to assess their work by remaining open to critique. This can aid in establishing the reliability of a study (Wisker, 2007).

Robson (2002,p. 184) points out that validity can be enhanced by assembling, using and communicating a 'Case Study plan'. By being up-front and presenting procedural operations

of a study a Researcher provides a transparency. This enables other readers to understand how all aspects of the research were carried out.

14. Triangulation of Methods

By employing multiple methods, as opposed to a single method, a Researcher can avoid bias which originates from single methods. This can prevent against vulnerability which may be associated with one method.

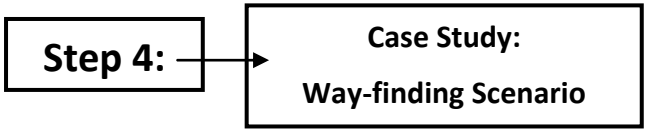
15. Findings are Transferable

This principle is concerned with how findings can be generalised and applied to a larger group or other contexts [also, referred to as external validity (Wisker, 2007)]. Specific experiences within specific contexts are related to more general hierarchical themes and concepts. This enables findings to be applied to other contexts.

Summary: Evaluation and Rigour

The qualitative Researcher has embraced criteria which are responsive to both her ideals and the focus of the research. These six Principles of *Evaluation and Rigour* [10-15] are the criteria selected to evaluate the research.

Within Step 3, Research Principles regarding: 1. Subject and Setting, 2. Process and Analysis, and 3. Evaluation and Rigour have been defined. Now, in step 4 the design of the Case Study will be considered.



3.4 Step 4: Case Study: Way-finding Scenario

This section will describe the evolution of the Case Study design which, along with the selection of methods, data collection and the subsequent analysis, developed through an iterative and evolving process.

Having described the Research Principles [Step 3], the paradigm of this research has been defined. Taking these Principles on board, the Researcher [armed with the goals of the study] took guidance from Lincoln and Guba (1985) to design the Case Study. Within this Step, five elements of the Case Study design will be demonstrated. Throughout this section the following details of the study will be explained:

- focus of the enquiry and boundary for the study [inclusion and exclusion criteria]
- collection of data [from where and from whom]
- successive phases of the inquiry
- evaluation of instrumentation to gather data [in addition to the Researcher as the human instrument]
- strategy to plan and record data collection [The full analysis is described in Step 5].

There are few evidence-based studies of way-finding in a building. Furthermore, there are no studies of real-life experiences of way-finding, undertaken by real-life Participants with a range of visual ability within the context of a real-life building.

In response to this gap in the knowledge the Case Study was designed to:

- Investigate real-life experiential components of way-finding.
- Recruit participants who have a range of visual ability/loss. Methods of simulating visual loss would not be used.
- Explore the task of way-finding, with people, within the context of a real-life public building.

As Way-finding is always based on both previously encountered and present experiences (Downs and Stea, 1977;Lynch, 1960;Golledge, 1999;Arthur and Passini, 1992), the methods employed in this study were designed to engage with Participants based on both previous and a present way-finding experience.

Development of the Way-finding Scenario, Piloting, Transcription and Analysis

When working with Participants who have varrying visual abilities it was always the Researchers aim to identifiy and mitigate areas of the study which had the potential to cause harm or discomfort. Before the Researcher could consider recrutiment and the various ethical implications of this study [which are fully documented within Appendix D and reflected upon within Step 6 of this Chapter] a period of time was spent piloting and refining each of the methods. In addtion to mind-mapping and time taken to research and evaluate methods of data collection and mediums of data collection [fully described below], a series of informal pilots with collegues and friends developed ideas the Researcher had in relation to how the way-finding scenario should be carried out.

These pilots were quick and messy and involved short bursts of thinking, diagramming and refining. Discussions relating to way-finding were carried out and ideas of discussion points and themes were carried forward into the real way-finding scenarios with the Participants.

From these initial way-finding conversations there were several instances when people wanted to show real examples of what they were explaining [e.g. as well as talking about a problem experienced because of a door the person wanted to show an example of the door and describe why it was causing a problem].

A *Way-finding Scenario* was designed as the Case-Study. It evolved to become a series of three sequential phases:

- **Phase 1: A Purposeful Conversation** (Burgess, 1982) which was based on Participants' memories of previous experiences of way-finding.
- **Phase 2: A Way-finding Task** where the Participant found their way from a starting point to a destination within a large public building. This was recorded by a handheld video camera and watched by the Researcher after the Way-finding Scenario.
- **Phase 3: A Post-Way-finding Task Purposeful Conversation** (Burgess, 1982) which was based on Participants' experiences of Phase 2.

Purposeful Conversation: Phase 1 and 3

> 'Conversation is a crucial element of field research' (Burgess, 1982,p. 107).

In Phase 1, conversation was utilised to explore Participants' past experiences of way-finding. In Phase 3 it was used to explore Participants' experiences of the way-finding task of Phase 2.

Through a process of evaluation, methods such as: surveys, questionnaires and different types of interviews were assessed to find a suitable way to engage with Participants about their past experiences of way-finding. Lessons were also taken from being immersed in the field.

In the initial stages of recruitment, conversation was used to interact with members of user groups about their experiences of way-finding. It was through attending these user-groups that the Researcher was made aware that traditional research methods such as questionnaires and interviews would be restrictive and logistically not practical.

Purposeful Conversation (Burgess, 1982) was selected because:

- people with a range of visual ability would be taking part and it was vital that the Researcher utilised a method which all Participants could use. The Researcher was aware that not all people with visual loss can read Text or Braille formats. She wanted to ensure that the Case Study enabled each Participant to describe his/her experience of way-finding in the same way.
- it was always the intention of the Researcher that the Participant led the conversation based on their experiences of way-finding.
- when compared with a more structured from of interview or questionnaire, the conversation can encompass general narrative of daily activities. In comparison, Burgess (1982,p. 165) states 'a standard set of questions would be far too narrow and would restrict the Researcher's perspective'.

It became apparent there was both a research issue and a missing element of the problem which this phase of research could not address:

- Issue: people often have difficulties in expressing, fully, their way-finding experiences (Arthur and Passini, 1992;Golledge, 1999).
- Solution: the recording of a way-finding trip.

Phase 2: Way-finding Task resolved these factors when each Participant took part in a way-finding task within a real-life building.

Way-finding Task: Phase 2

Way-finding experience has found to be largely internalised and difficult for Researchers to extract (Arthur and Passini, 1992;Golledge, 1999). This Phase enabled the Researcher to gain insight into how the Participant found their way.

The addition of Phase 3: Post Way-finding Task Purposeful Conversation enabled a means for the Participants to reflect on their experience of Phase 2. It also allowed for further discussion about way-finding instigated by their new way-finding experience and enabled a debriefing [identifying any adverse effects caused by the scenario] to take place. This was a way for methods of data collection to become triangulated.

Way-finding Scenario Considerations

There were elements the Researcher needed to be aware of when carrying out the Way-finding Scenario: 1. Considerations when carrying out the conversations [Phase 1 and Phase 3] and, 2. Issues associated with the use of observation [Phase 2].

In taking advice from Robson (2002) when carrying out the Purposeful Conversation (Burgess, 1982) [or unstructured interview (Robson, 2002)] the Researcher needed to be aware of:

- Listening more than she speaks
- Framing questions with clarity
- Not leading the conversation
- Withdrawing topics which make Participants feel uncomfortable
- Having a record of the conversation

- Framing a set of conversation topics as *'probes and prompts'* (Robson, 2002,p. 272)
- Developing a narrative of topics
- Avoiding asking '*long questions, double-barrelled questions, questions involving jargon, leading questions* and *biased questions'* (Robson, 2002,p. 275).
- Being flexible yet drill into information in relation to the research focus

In regard to the Way-finding Task, the Researcher needed to be aware of the 'Hawthorne Effect' – the fact that the person may change their actions if they know they are being observed (Robson, 2002). The Researcher needed to be aware that the Participant's way-finding behaviour could change due to the fact that they were undertaking a simulated Way-finding Task.

Additional considerations in regard to the Research Principles are outlined and addressed within Step 6 of this Chapter.

The specific details of each Phase of the Way-finding Scenario will now be considered.

Participant Information

Training, Techniques and Technologies

Way-finding Experiences

Environmental Inputs/ Sensorial Cues

Way-finding Aids

Familiar and Unfamiliar Environments

Becoming Lost

Emergency Situations

Accidents

Destinations

Figure 3.8: Phase 1: Purposeful Conversation Topics
[A full sample of conversation prompts can be found in Appendix A]

Phase 1: Purposeful Conversation

'An Anecdote is worth a thousand data points' (Newell, 2011).

Method Statement & Reflection

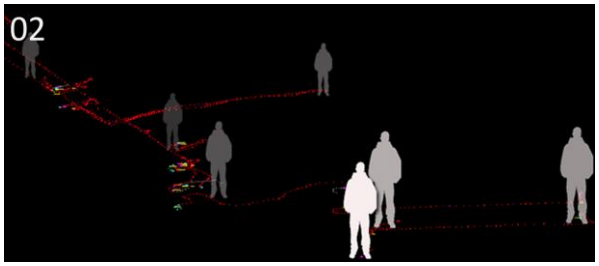
The method of purposeful conversation was utilised in the initial way-finding phase as an unobtrusive way to gather narrative and provide insight into Participants' memories of previous experiences of way-finding in buildings.

In taking advice from Burgess (1982) a series of topic headings relating to the research themes and previous Participant conversations emerged during the implementation and development of Phase 1. These topic headings provided a flexible structure basis for the Phase of Purposeful Conversation.

Although remaining flexible, these topics enabled the conversation to flow and prevented the conversation from becoming disjointed. The general framework of topics [figure 3.8] evolved continuously through each Participant conversation.

Recording & Setting

The conversation was recorded and later transcribed and analysed by the Researcher. This enabled the conversation to be captured without loss of detail and ensured that no distraction was caused by note-taking. The setting was quiet and comfortable and the atmosphere was relaxed and informal. Refreshments were provided and the conversation was not run on a timed basis to ensure Participants were allowed as much time as they needed to talk about their experiences.



Way-finding Task Instructions

1. A Basic Level of Information

You are attending a meeting. You have arrived early and have plenty time to find your way there. You should way-find as you normally would when in this situation. If you use an aid, then please feel free to use it throughout the task. If you ask for directions, then feel free to ask for directions. If you normally take someone with you then take someone with you. You have my mobile number if you need me/want me to find you/ want to stop at anytime.

This is your starting point and your destination is 'The Post-graduate Office' of this building. OK? Do you want to ask any questions or be given anymore information?

2. An Intermediate Level of Information

It was planned that this level of information was given in response to the participants questions.

Figure 3.9: Phase 2: Way-finding Task Instruction

Appendix A provides details of the Way-finding Day Checklist and Debriefing procedures carried out by the Researcher.

Phase 2: The Way-finding Task

Method Statement & Reflection

Within Phase 2, each Participant undertook a way-finding task within the same building located on the University of Dundee campus. They were asked to find their way from a starting point to a destination point [figure 3.9].

Each Participant was taken to the starting point [the site of the building] and was given the destination office title and the name of the office occupant[2]. They were provided with no directional guidance or advice on how to reach the destination from the starting point. The way-finding task was an exploratory investigation which took place during the building's regular opening times. Each Participant was asked to undertake the task as they normally would when visiting an unfamiliar building [i.e. if he/she normally asked at the reception for directions then he/she should ask the receptionist in this building for directions]. Mobile phone numbers were exchanged between Researcher and Participant and it was agreed that if difficulties arose for the Participant during the way-finding task then the Participant and Researcher would make plans to meet. Each Participant carried a small digital video camera at hip height throughout their way-finding task. The task was not run on a timed basis.

Recording & Setting

Participants carried a small digital video camera which recorded their entire way-finding journey from the starting point to the destination point. The use of the video camera was ideal as it recorded the whole journey and all encounters were recorded.

[2] **Post-Viva Reflective Footnote:** Participants were given the same level of – 1] a basic level of information (outlined within figure 3.9). If they then asked for more detail – 2] an intermediate level of information was given which was information given in direct reply to the participants questions. Although given the chance to ask further questions, none of the Participants asked for further information.

The selection of the way-finding setting was based on logistical factors. It is a real-life large, public building. It was accessible with regular opening times which were ideal for the Way-finding Scenario days. It is composed of various levels, stairs, lifts, rooms, departments etc. It is compliant with current building legislation. The Researcher was able to access floor plans. The Researcher's office is located in the building so she has extensive prior knowledge of the building [this was especially useful if the way-finder became lost]. Toilets and refreshment making facilities were also available.

The Way Finding Setting utilised during the first Way-finding Scenario was deemed to be a building that provided a rich source of way-finding data. Using the same building enabled comparisons to be drawn between the different Participant's experiences. Therefore the Researcher decided to retain this building as the setting for all further Way Finding Scenarios.

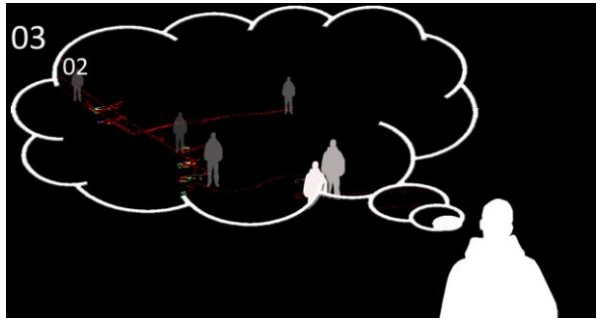


Figure 3.10: Phase 3: Purposeful Conversation

Phase 3: Purposeful Conversation [Post Way-finding Task]

Method Statement & Reflection

Phase 3 [figure 3.10] was implemented immediately following the Way Finding Journey of Phase 2. This employed the Purposeful Conversation technique, as utilised in Phase 1. The purpose of Phase 3 was to gain insight into the Participant's experience during Phase 2.

Again as with Phase 1, topics discussed evolved and developed. The conversation framework was flexible in structure to encourage Participants to talk about experiences of way-finding in the task that was previously undertaken. Participants' memories of previous way-finding experiences were activated by events and occurrences which happened during Phase 2 and they also talked about these.

Recording & Setting

As in Phase 1, the conversation was recorded and later transcribed and analysed by the Researcher. This enabled the conversation to be captured without loss of detail and ensured that no distraction was caused by note-taking. The setting was quiet and comfortable and the atmosphere was relaxed and informal. Refreshments were provided and the conversation was not run on a timed basis to ensure Participants were allowed as much time as they needed to talk about their experiences.

The Initial Way-finding Scenario - Process, Methods Assessment & Reflection

Each Way-finding Scenario developed both the phases and the process and categories of coding; however, the first Way-finding Scenario was followed by a more significant period of reflection and refinement. It raised a number of logistical issues and provided the Researcher with necessary experience in working with the Participants. Fundamentally, it was used to evaluate appropriateness of the proposed: Phases of the Way-finding Scenario; way-finding task setting; and participatory input by people with different types of visual impairment. It enabled the Researcher to gain insight into the processes of capturing and then coding data and provided an insight into methods and skills of; working with people with vision-loss; structuring conversations; capturing data relating to the task of way-finding in a building when the Participant has a visual impairment; storing and collating data and; developing skills in analysing and coding data from the entire research investigation.

A series of Case Study elements were reviewed, assessed, and changes were made:

- The organisation of the *Way-finding Scenario* Day.

A Way-finding Day Package was put together by the Researcher to ensure she was prepared for each Participant. Details of this preparation can be found in Appendix A.

- Methods of Recording

When seeking suitable recording equipment, especially for Phase 2 of the Way-finding Scenario, various devices were considered such as: GPS systems, responsive sensors, transponders, WIFI triangulation techniques and mobile phone triangulation, tagging devices, radio transmittance, blue-tooth equipment, as well as devices such as Wireless transmitter/Receiving kit for body worn cameras. However, these devices were not suitable for a number of reasons including: time constraints, costs and training. Also, the Researcher was always aware to ensure the Participant did not have to learn how to use the technology or feel uncomfortable when 'wearing' the recording device.

Instead, a Dictaphone and Digital Video Camera were used and recording methods were successful. The Dictaphone was used to record all conversation and The Video Camera recorded all Participants' Way-finding Trace. All data was later transcribed by the Researcher. She was able to analyse as she transcribed and gained a rich in-depth understanding of the data. An amendment was made to the video camera which was fastened to a belt to save the Participant from holding it. This ensured that the Participant would have a free hand if they used a cane, guide dog etc.

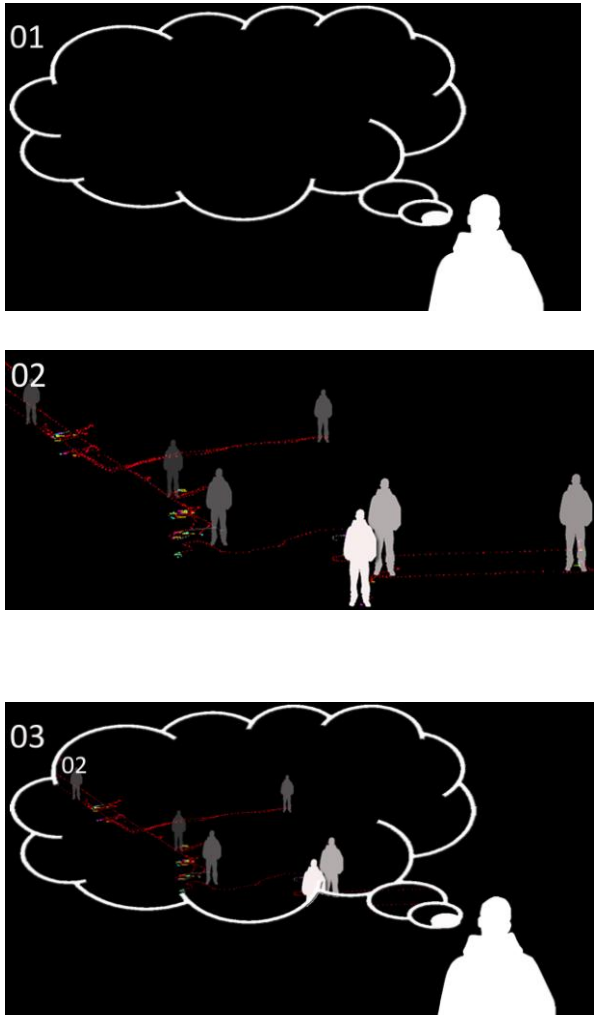


Figure 3.11: The Way-finding Scenario

Step 4: Summary

Within Step 4, the Case Study – A Way-finding Scenario – has been defined. The three phases of the Way-finding Scenario along with the methods of data collection have been described.

As illustrated in figure 3.11, each of the Participants took part in:

- **Phase 1: A Purposeful Conversation** (Burgess, 1982) which was based on Participant's memories of previous experiences of way-finding.

  This was recorded using a Dictaphone.

- **Phase 2: A Way-finding Task** where the Participant found their way from a starting point to a destination within a large public building.

  This was recorded by a handheld video camera and watched by the Researcher after the Way-finding Scenario.

- **Phase 3: A Post-Way-finding Task Purposeful Conversation** (Burgess, 1982) which was based on Participants' experiences of Phase 2.

  This was recorded using a Dictaphone.

In this next Step, the method of Analysis will be demonstrated.

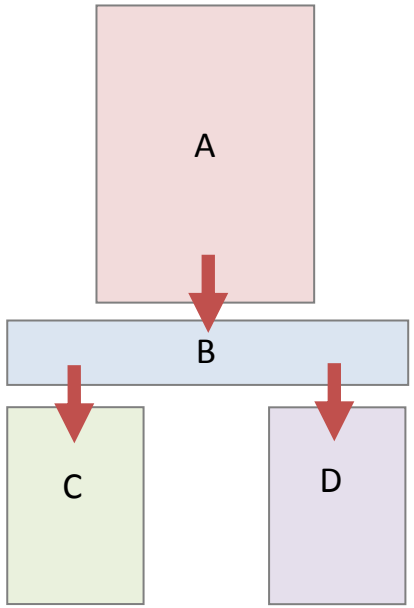


Figure 3.12: Overall Process of Analysis

3.5 Step 5: Case Study: Method of Analysis

Step 5 demonstrates the overall process of analysis adopted in this study. The nature of the iterative processes utilised during the research analysis were complex and did not evolve in a linear way. Therefore, throughout this section, the Researcher has developed hierarchical diagrams to explain the process of analysis.

This analysis is divided into four sections [figure 3.12]:

- **A. Transcription and Recording:** *how the raw data was processed and stored.*
- **B. Filling the Data Bank:** *the different types of data*
- **C. Analysing the Participant Data Bank:** *how Participant data was analysed*
- **D. Analysing the Way-finding Data Bank**: *how Way-finding Data was analysed*

Each of these processes was fundamental in enabling the Researcher to gain control over a large volume of different types of data. Figure 3.12 is used throughout this section to guide the reader through each stage of the analysis

Each set of Participant data went through this analysis process immediately after the data was collected. Different from a more traditional method of data analysis [i.e. gathering all data, from all Participants and returning to analyse it all together] this process was iterative [i.e. data is gathered from the first source and it is analysed before data is collected from the second source and so on] (Robson, 2002).

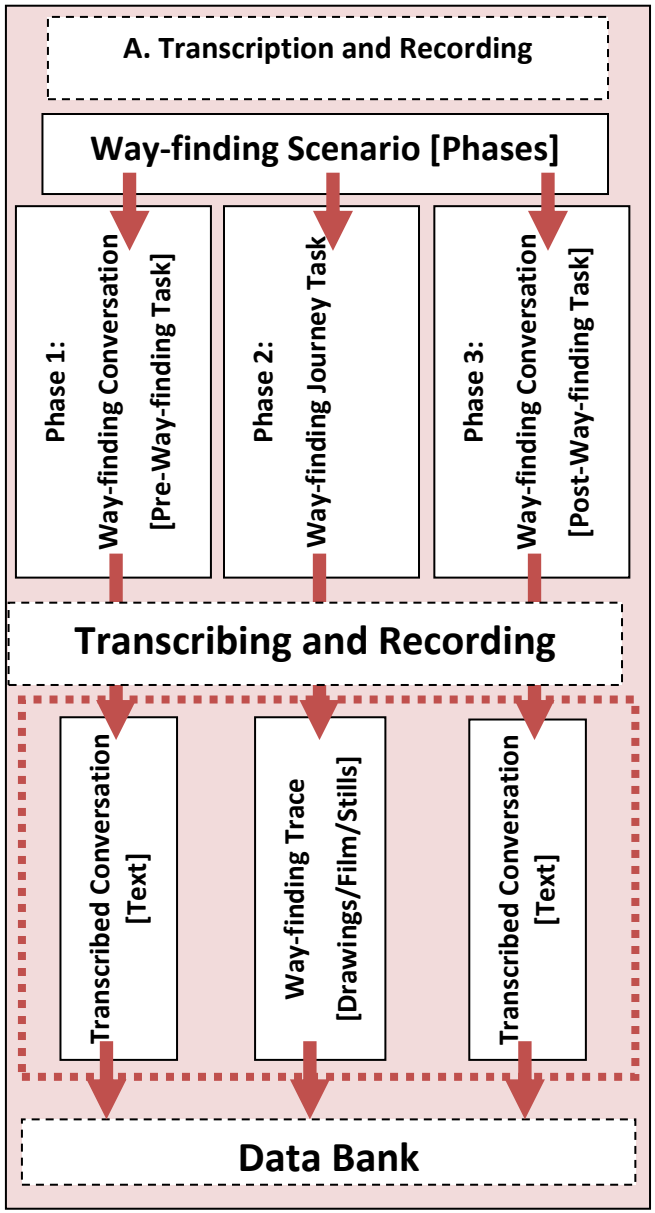
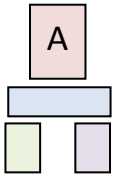


Figure 3.13: Breakdown A: Transcription and Recording



A. Transcription and Recording

As illustrated in figure 3.13, Data from all three phases of the Way-finding Scenario was transferred, transcribed and recorded. There were two main types of data: Transcribed Conversation and Way-finding Trace.

Phase 1: Way-finding Conversation [Pre-Way-finding Task] and Phase 3 Way-finding Conversation [Post-Way-finding Task] produced audio files which were recorded using a Dictaphone and then transcribed using digital transcription software NHC Express Scribe. This text file was then transferred into the hermeneutic computer program Atlas.ti in preparation for analysis.

Phase 2: The Way-finding Task produced video and audio recordings which became a record of the Participant's way-finding trace. This was recorded using a Panasonic SDR-S7 Digital Camera which was carried throughout Phase 2: The Way-finding Journey Task.

All audio was transcribed and using video editing software Adobe Premiere Pro along with Autodesk AutoCAD, the Participant's movements were charted onto the buildings floor plans. All encounters were logged [e.g. conversations, accidents etc.] and the Participants location at every second in time [25th frame] was plotted onto the floor plan. This became a record of each Participant's way-finding trace. A commentary log and distilled images from the digital footage also accompanied this trace. [This process of transcribing Phase 2 is illustrated in figure 3.14].

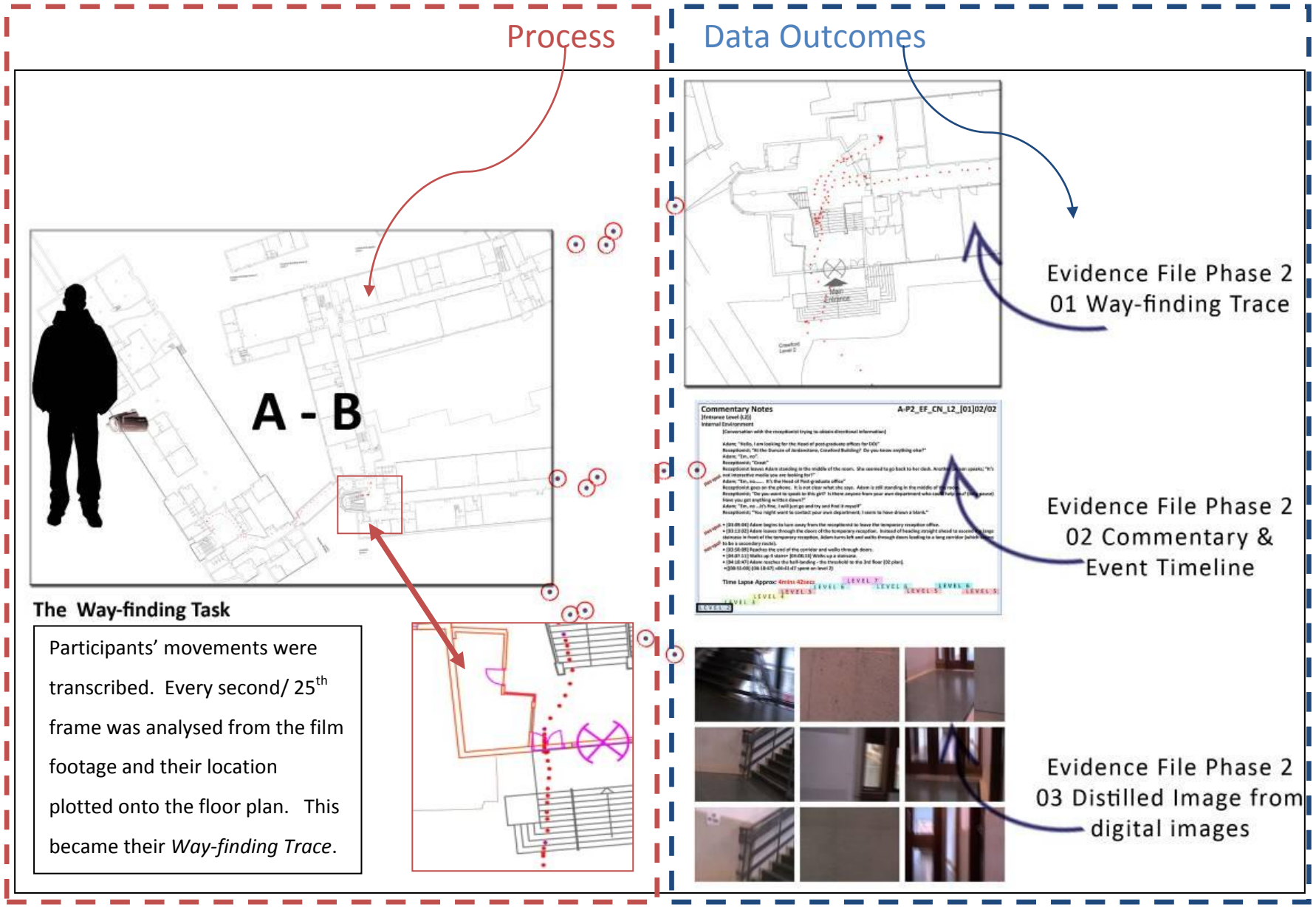


Figure 3.14: Transcribing and Recording - Way-finding Trace

Before being put into the data bank the conversation went through a process of open coding. Initial ideas about categories relating to way-finding emerged. Conversations were divided into quotes and the coded quotes were put into the data bank in preparation for the next stage of coding [figure 3.15].

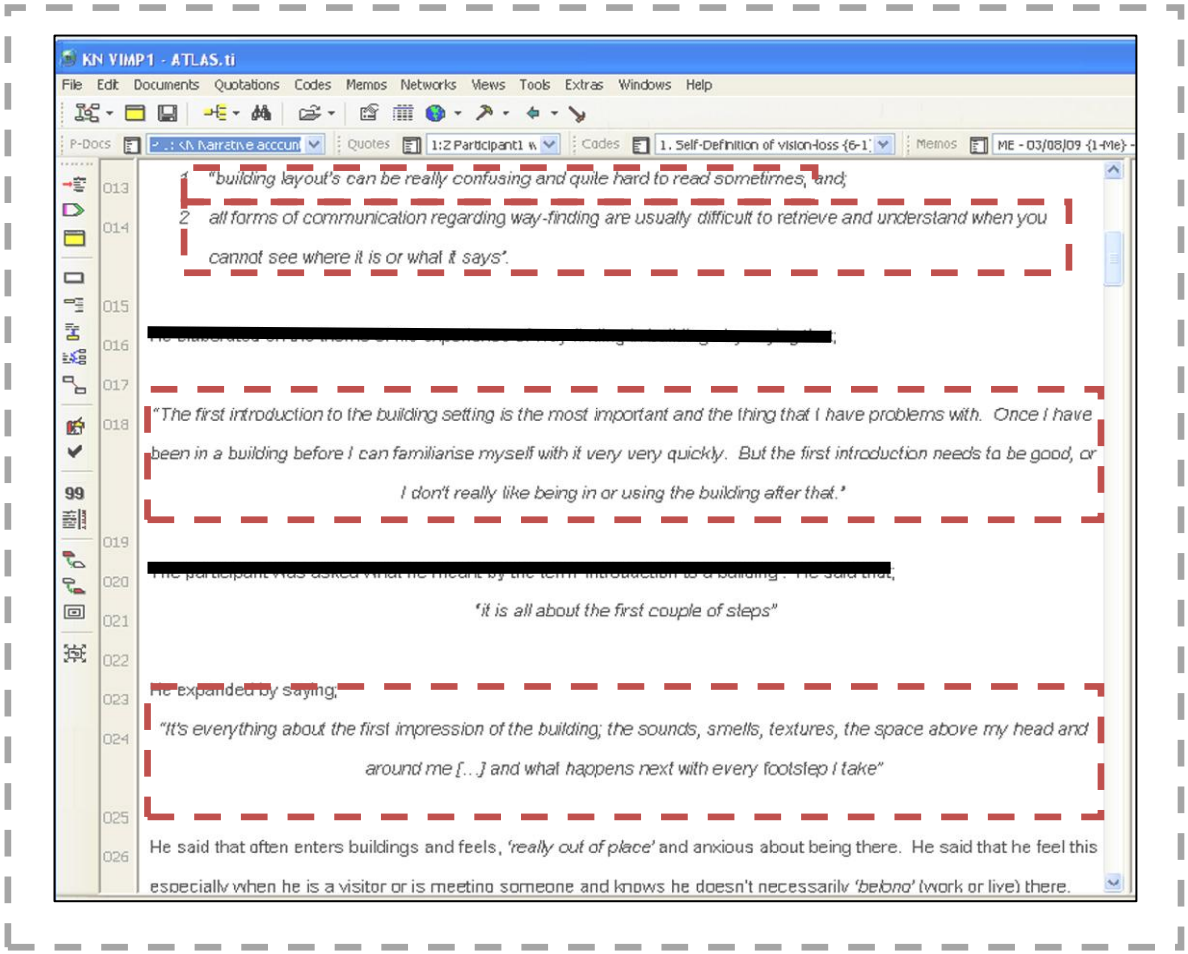


Figure 3.15: Transcribing and Recording - Conversations

The three Phases of the Way-finding Scenario filled a Data Bank with two types of data [figure 3.16]: [A] *Transcribed Quotes* [Quotes from Phase 1, 2 & 3] and [B] *Way-finding Trace* [which incorporated floor plans, plotted way-finding trace, film footage and photographic stills from Phase 2]. All transcribed [raw] data was saved and stored in accordance to this study's ethical protocol and data protection approval [Appendix D and E].

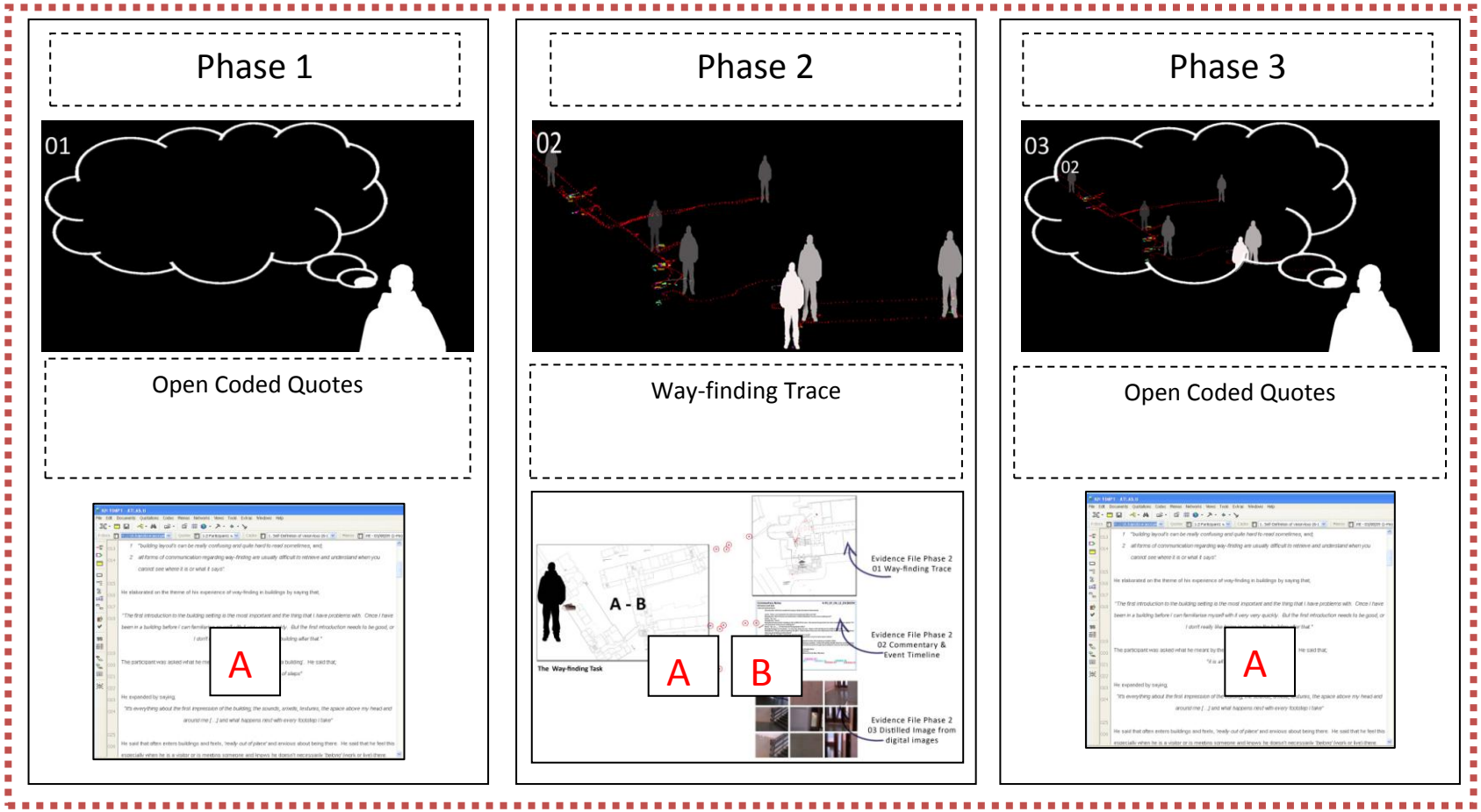


Figure 3.16: Summary - Data Bank Contents

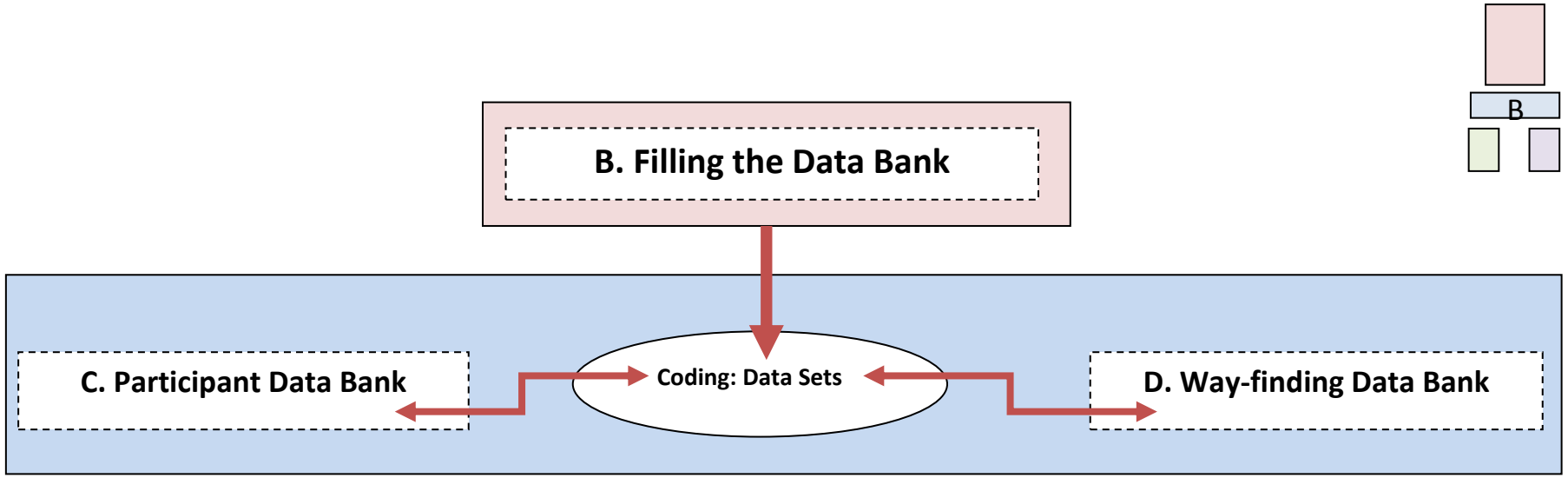


Figure 3.17: B The Data Bank

B. Filling the Data Bank

Using an axial form of coding (Corbin and Strauss, 1990), two categories emerged from the Data Bank [figure 3.17] which filtered data into two Data Sets.

01. *Participant Data Bank* which included conversational data relating to Participant details [e.g. their personal details: name, age etc.]
02. *Way-finding Data Bank* which included all way-finding data relating to the experiences of way-finding [e.g. Participant quotes relating to experiences of way-finding as well as way-finding trace].

Using qualitative data analysis tool Atlas.ti, all data [Transcribed Conversation and Way-finding Trace] was initially coded under these two themes. The analysis of these two Data Banks will now be discussed further.

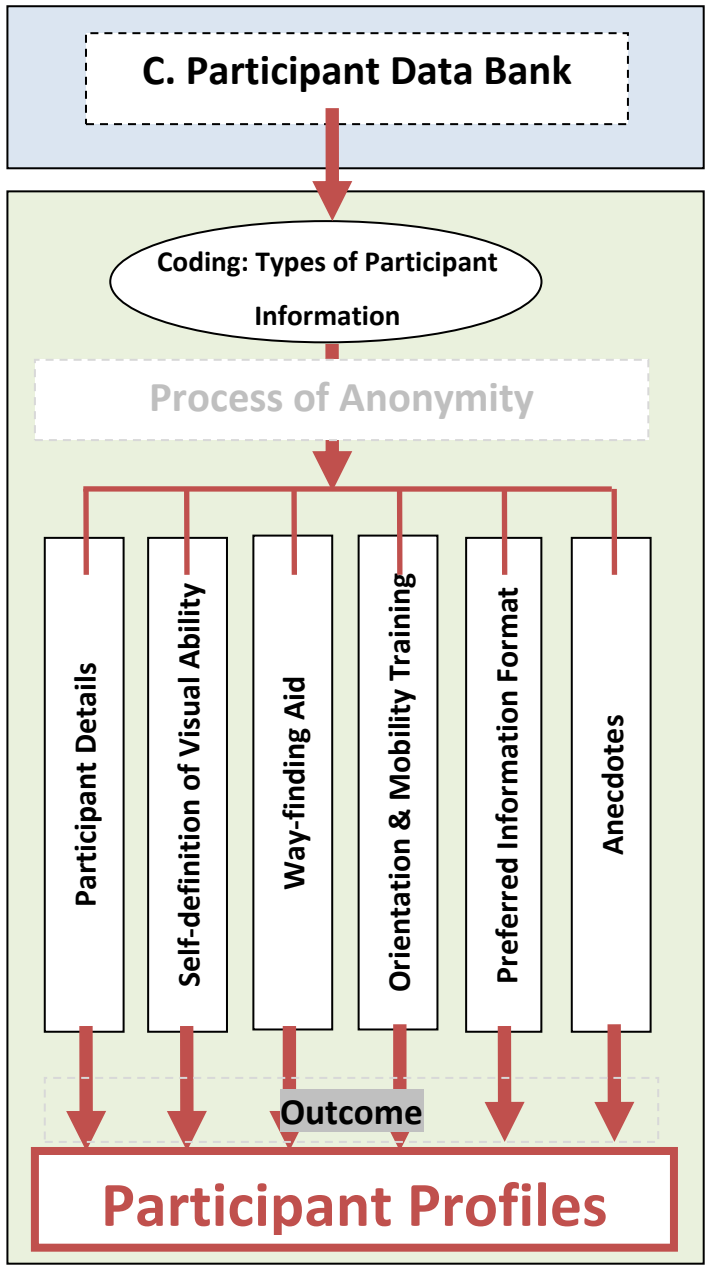
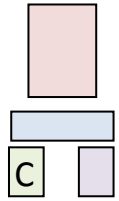


Figure 3.18: Data Set 01 Participant Data



C. Participant Data Bank

The Participants involved with this study talked about all aspects of their lives and their visual loss and so this data set became a record of them - their narrative. This information was drawn solely from the purposeful conversations [Phase 1 & 3]. The process of this analysis is illustrated in figure 3.18.

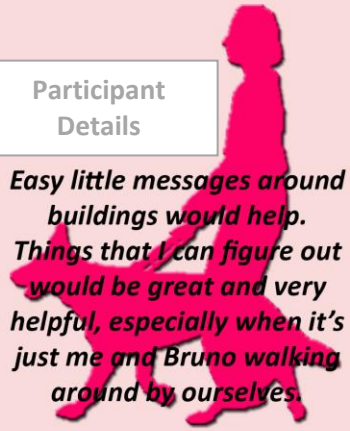
Before a 2nd level of axial coding took place which related to Types of Participant Information, and in accordance with the conditions set out in the ethical application, the data went through a process of anonymity. The Participant's real names and other information which, if used, would reveal their identity was removed. Using Atlas.ti, six axial codes emerged:

- **Participant Details:** including general detail such as name, age, occupation etc.
- **Self -Definition of Visual Ability:** including detail about their visual loss.
- **Way-finding Aid:** including detail about general way-finding experience.
- **Orientation and Mobility Training:** including detail about education relating to orientation and mobility and these experiences.
- **Preferred Information Format:** Braille, large text format, audio etc.
- **Anecdotes:** including stories of their experiences [not just in relation to way-finding].

Participant Profiles

These codes contributed to forming individual *Participant Profiles* which collated the personal information together under pseudonyms to protect each Participant's identity. This evidence file built a narrative of the Participants, both individually and as a Participant group. Participant Profiles [figure 3.19] were the first outcome of the analysis [Appendix B].

02 Katie's Profile:



Participant Details

Easy little messages around buildings would help. Things that I can figure out would be great and very helpful, especially when it's just me and Bruno walking around by ourselves.

Name: Katie
Age: 40-50 years old
Sex: Female

Occupation:
Legal Service Civil Servant
Solicitor (Pre-Sight-Loss)

Mobility / Orientation Aids:

Guide-Dog 'Bruno'. Me and Bruno travel all over the country nearly every day of the week. I have to use a Cane if Bruno is ill.

Way-finding Aid

Hobbies:
Travelling
Meeting with friends
Listening to audio books
Shopping

Braille Reader: Yes

Preferred Information Format

I can read Braille, not brilliantly, and its not my preferred form. I am not very fast at it. There is often the assumption that if you are blind then that means that you can read Braille.

Katie's definition of her Visual Ability:

I used to be able to see. I lost my sight 25 years ago, and I am now totally blind. I have some sense of shadows, but nothing that is at all useful. I can't see a shadow and think 'oh I need to avoid that area'. I have no useful sight at all when I am out and about.

My sight-loss came about because my mother contracted a virus just before I was born, it passed onto me and then genetically onto my children.

I lost my sight when I was 21, so I know what things look like and I know what colours are. I remember my vision, the grass is green and I know what green is.

Katie's Way-finding:

Self-definition of visual ability

I am a well travelled person because of my work, and I have worked in the public sector for 27 years. I have had more of my fair share of experience of public buildings in local government and civil service.

My mobility in my home is just me memorising and using my sense of sound and I use a guide dog to get around outside. I am a very competent person at being able to get out and about but I am not confident with a white stick.

I can only sense things through sound and touch really when I am way-finding around a building. If you can't touch the edges of an open space, you have to use hearing. But if you can't hear the echoes back from the building line - either because of the other noises, the number of people in it, or because the building line is so far away -then you can't use it and it is a really vulnerable feeling.
I can't tell you how vulnerable you feel when you can't use either sound or touch.

Katie's Story:

Anecdotes

When I was a sighted person, the information I took in was all the visual information. I never really paid all that much attention to the hearing or the rest because I never really needed it.

When you are blind or partially sighted you memorise. When you have been to a building for the first time you commit certain information to memory. Because I used to be able to see, I quite often memorise things visually so I can remember layouts of roads or certain parts of buildings. I mean you try to not fill your mind with rubbish, but things you need to know. So I try to figure things out in my head visually in a sort of map style .

I try to remember certain bits of information like 'oh that is where the carpet starts so I must be at that point'.
But it might not be a visual thing sometimes, it could be a tactile image, but mostly for me it is a visual thing because I used to be able to see. So if you described something to me, if it had some sort of pattern to it I could understand and start to visualise it. But if it is higgledy-piggledy then how would someone be able to explain that and how would I be able to translate that in my mind and visualise it?

Orientation and Mobility Training:

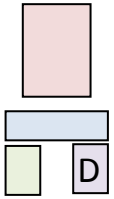
O & M Training

I was trained with the long cane about 10 years ago but I just didn't feel comfortable with it. You have to use the cane about a foot in front of you to check if there are holes or dropped kerbs or stairs and I just didn't feel safe enough. I kept tripping up over the bloody thing. It just didn't suit me and didn't make me feel that comfortable and I'd walk a lot slower.

The idea was that I would be able to use the cane if the dog was retired or was ill or whatever. I feel much more confident with the dog and travel all over Scotland because of my job .

Bear in mind the dog is only trained to walk in straight lines and sit at steps and kerbs. I mean all the dog is doing is stopping me from bumping into things or people, but at the end of the day I still have to make the decisions about whether I need to go straight ahead or left or right or whatever - I need to know where I am going.

Figure 3.19: Annotated example of the Participant Profiles which can be found in Appendix B



D. Way-finding Data: Way-finding Hot-spots

D. Way-finding Data Bank

Measurements of circulation, circulation elements, measurements of way-finding, way-finding components, elements of way-finding, way-finding pause-stops, experience-stops, way-finding stop-spots, way-finding events, event hot-spot, way-finding interaction hot-spots,

Way-finding Hot-spots

Figure 3.20: Evolution of Way-finding Hot-spot terminology

Data Set 02, consisting of data from Phase 1, Phase 2 and Phase 3, became an analysis of the Participants' experiences of way-finding.

Through analysis of both the conversations and the way-finding trace it emerged that there were specific identifiable events and occurrences [places and experiences] within a Way-finding Journey which impacted on a way-finders experience of finding their way. These were temporal and/or spatial experiences and were negative [e.g. experiencing a hazard] and/or positive experiences [e.g. pausing to look at a piece of art work – remembering that many people with visual loss have some degree of visual ability (Barker et al., 1995)].

Terminology for these way-finding events evolved throughout the study and early examples [figure 3.20] included such names as: stop-spots, pause-stops and experience-stops. These experiential components were finally termed ***Way-finding Hot-spots*** by the Researcher. The term ***Way-finding*** is used to describe the activity the participant [way-finder] is carrying out as they travel through a building and the term ***Hot-spot*** is used to describe a moment, place, event or significant experience of the way-finding journey.

When deciding to use the term 'hot-spot' the Researcher was aware that it could be perceived as a negative occurrence therefore recognised that it must be fully defined to ensure it is recognised as being either a positive or negative experience.

The term 'hot-spot' already exists in everyday language and is recognised as being both a negative term [for example in areas of media the phrase 'traffic hot-spot' is used to describe

a traffic build up in road traffic reports (Williams, 2005)], and a positive term [for example in the realm of tourism the phrase 'holiday hot-spot' is used to describe an exciting tourist destination (Meldrum, 2011), or popular restaurant (60 by 80 Media, 2009) and in the world of computing a 'Wi-Fi hot-spot' (British Telecommunications plc, 2007) is commonly used to describe an area where the internet can be connected to].

Within this study the term Way-finding Hot-spot[s] is used in regard to any encounter or event [temporal or spatial, positive or negative] which was experienced by the Participants when way-finding. They were specific happenings which invoked a physical or emotional response from the way-finder either in their past memories or their present experiences of way-finding.

From the outset it was important that the positive and negative Way-finding Hot-spots should be perceived to be of equal importance. Previous Researchers have put the importance on the negative aspects of being in a building however, this study from the outset was driven to uncover both the positive and negative experiences – depicting the holistic journey. This is why they are both termed to be Way-finding Hot-spots, there is no hierarchy of importance, and no distinction other than positive and negative is used. This is also important as one way-finder's *positive* Way-finding Hot-spot could be a *negative* Way-finding Hot-spot in someone else's experience.

Within the conversation data [Phase 1, 2 and 3] Way-finding Hot-spots recognised as quotes relating to way-finding experiences were extracted [figure 3.21].

Within the Way-finding Trace [Phase 2] Way-finding Hotspots recognised as clusters of seconds [figure 3.22] were extracted. All Way-finding Hot-spots were stored in preparation for synthesis.

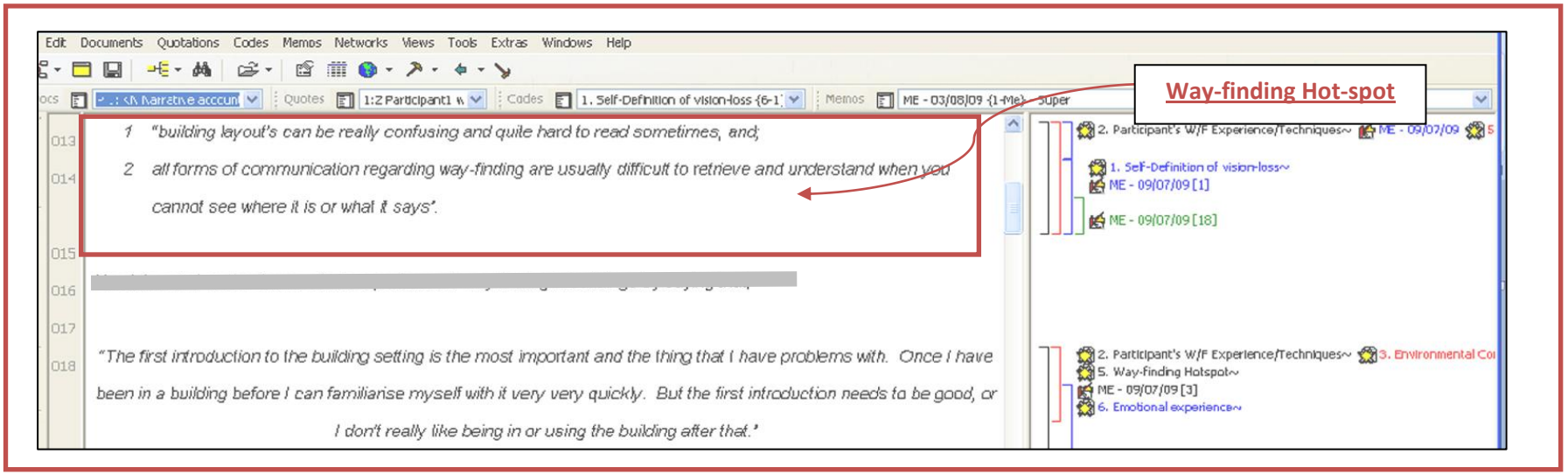


Figure 3.21: Within the conversation data Way-finding Hot-spots recognised as quotes relating to experiences were extracted

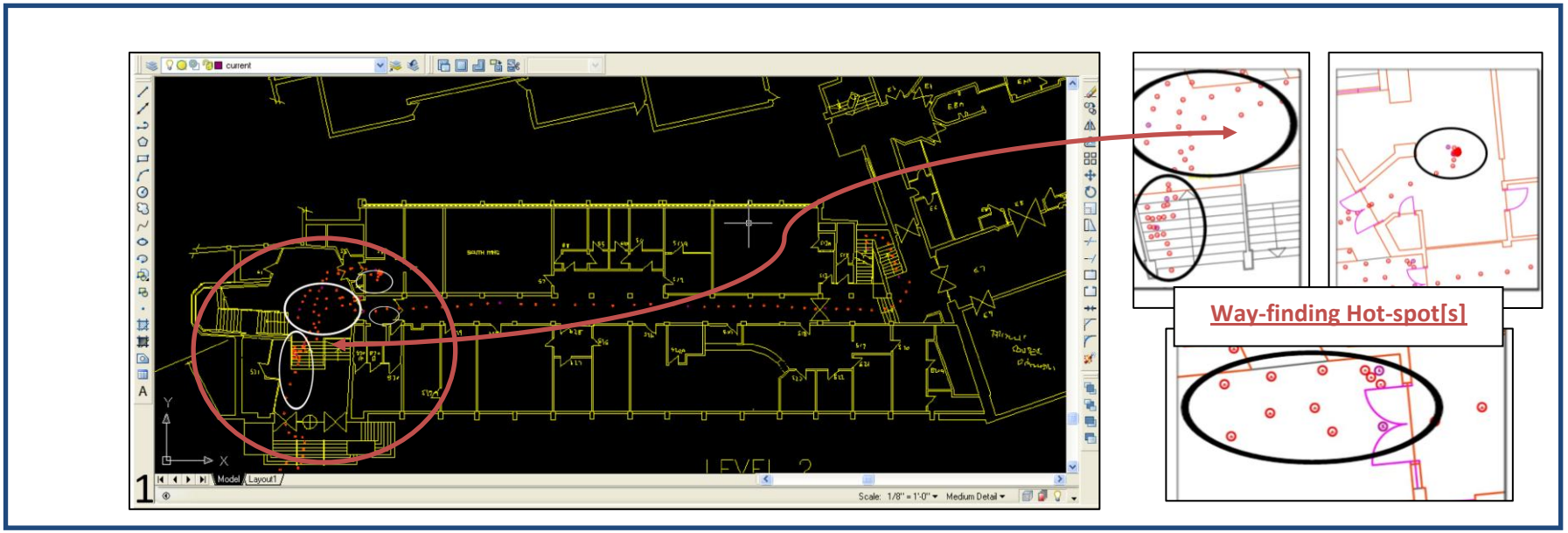


Figure 3.22: Within the Way-finding Trace Way-finding Hotspots recognised as clusters of seconds were extracted

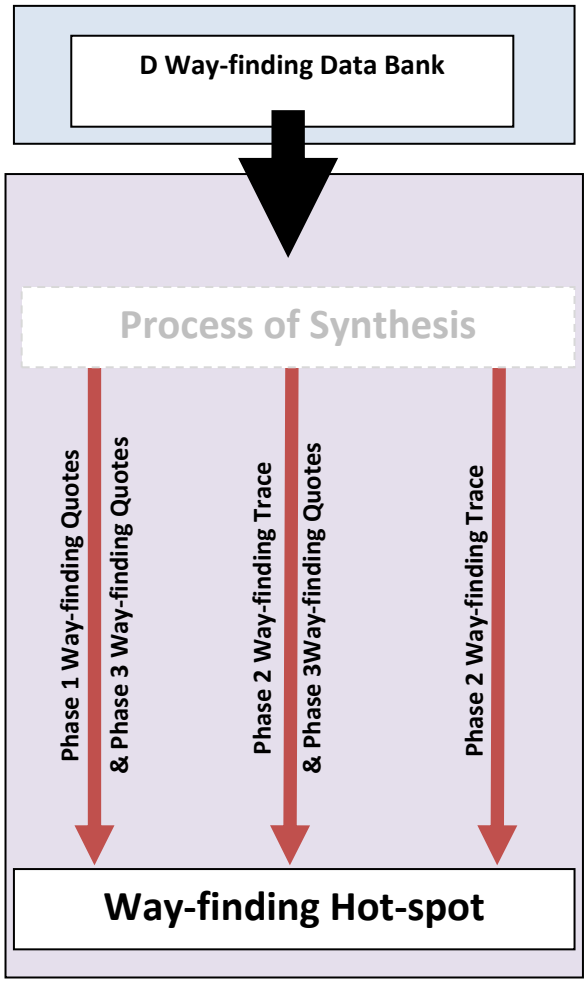
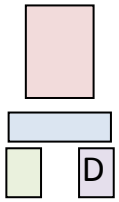


Figure 3.23: Data Set 02 Way-finding Data Synthesis



Synthesis of Way-finding Hot-spots

The challenge, when working with this data set, was the synthesis [figure 3.23] of different types of data [i.e. conversation, floor plans, still images and film footage]. Once this was achieved it became obvious that there were three ways in which Way-finding Hot-spots were evidenced by each Participant:

1. Quotes relating to way-finding experience [Data from **Phase 1** and **Phase 3**]
2. Quotes, way-finding trace and stills relating to experiences of way-finding encountered during the Way-finding Task. [Mostly Data from **Phase 2** and **Phase 3**].
3. Way-finding Trace, stills and quotes relating to experiences of the way-finding task [Data from **Phase 2**].

In this synthesis the different types of data [quotes and trace relating to the same Way-finding Hot-spot] were grouped to form one Way-finding Hot-spot. This process was carried out with each Participant's data.

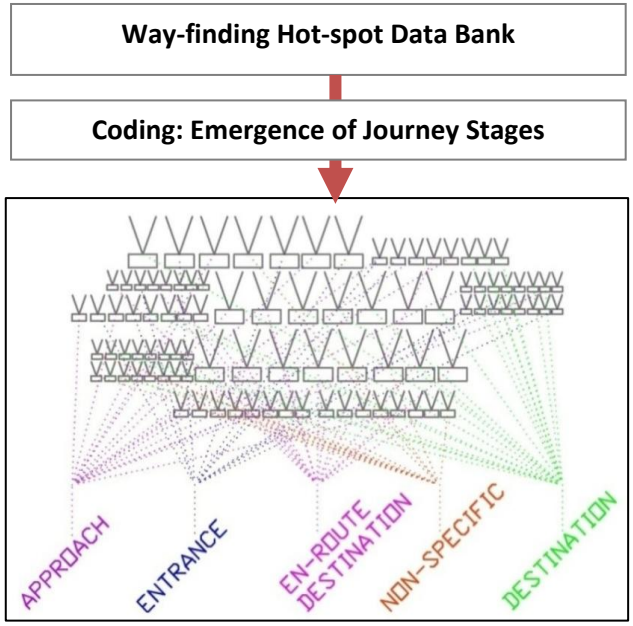


Figure 3.24: Emerging Journey Stages

Way-finding Hot-spots – Journey Stages

The Way-finding Hot-spots now synthesised, went through another stage of coding. It emerged that way-finding around a building is a fluid journey – a *Way-finding Journey* - which is composed of Journey Stages.

Ching (1996) and Arthur and Passini (1992) have defined the importance an Approach and Entrance is to a building. However, it emerged from data that there were four distinct stages encountered on a Way-finding Journey [figure 3.24]: Approach, Entrance, En-Route Destination and Destination. There was also Non-Stage Specific data.

The codes Non-specific and En-route Destination were developed much later in the iteration of coding. Non-Specific categorised any condition or event which was not specific, particular or exclusive to a definable Journey Stage [e.g. Approach or Destination]. This code has been successful in preventing repetition. En-route Destination was a code that categorised other types of Destination [e.g. toilets] which were different to the pre-determined Destination which was sought from the start of the Way-finding Journey.

The Way-finding Hot-spots were initially coded by a Journey Stage. Each Journey Stage arose iteratively through the process of analysis and together they define a prototypical Way-finding Journey [figure 3.25].

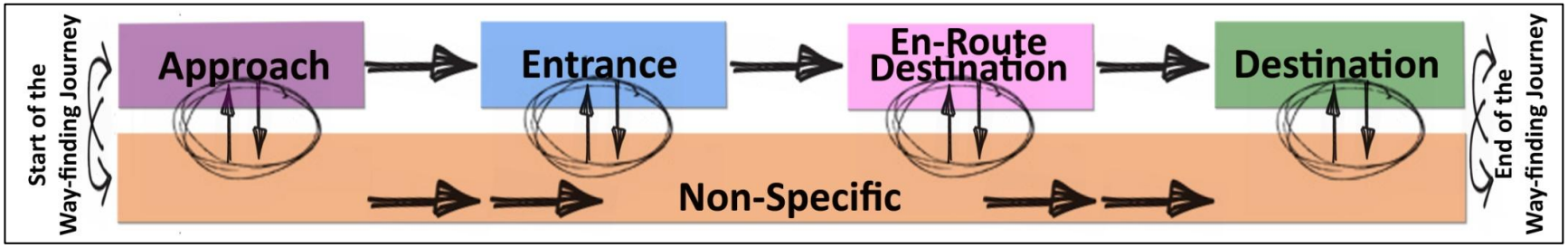


Figure 3.25: Journey Stages

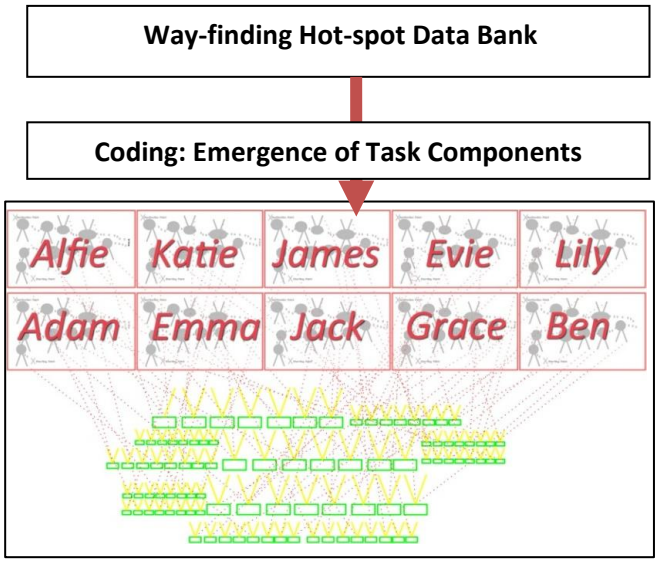


Figure 3.26: Emergence of Task Components

Way-finding Hot-spots – Task Components

The Way-finding Hot-spots, now categorised by appropriate Journey Stage, went through another stage of coding where they were organised based on a Task Component.

Harper and Green (2000) put forward the idea of 'tasks' when building their theory of way-finding. In this study Task Components emerged from the Way-finding Hot-spots. This was a highly iterative process as each set of Way-finding Hot-spots added to the hierarchy of Task Components [figure 3.26].

Task Components were the 'mini-missions' way-finders had to undertake at a micro level in order to, at a macro level, complete a Way-finding Journey. They became the 'to do list' of way-finding. Way-finding Journeys are broken-down into a hierarchy incorporating top level tasks as well as sub-tasks [and sub-sub-tasks].

A Way-finding Journey is composed of Journey Stages which are made-up of a hierarchy of Task Components [figure 3.27].

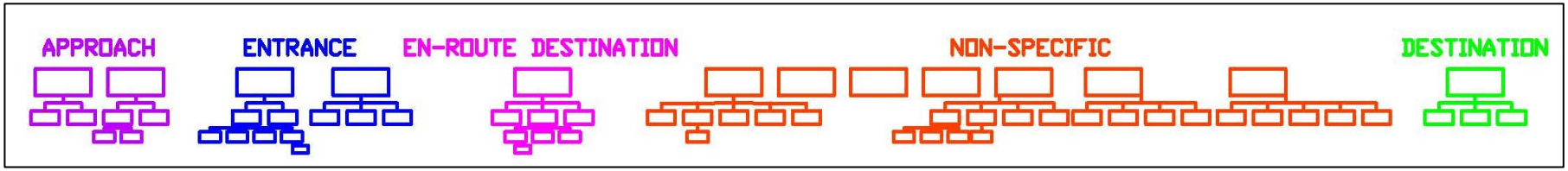


Figure 3.27: The hierarchy of Task Components coded Way-finding Hot-spots within each Journey Stage

Task Components, Way-finders Questions and Communication Requirements

The analysis of Task Components highlighted a Communication Requirement [figure 3.28]. This was posed as a Way-finder's Question.

This Question is a summation of the Way-finders information need – what they require to way-find a specific Task Component within a specific Journey Stage. Secondly a Communication Requirement Type for each of these questions was identified.

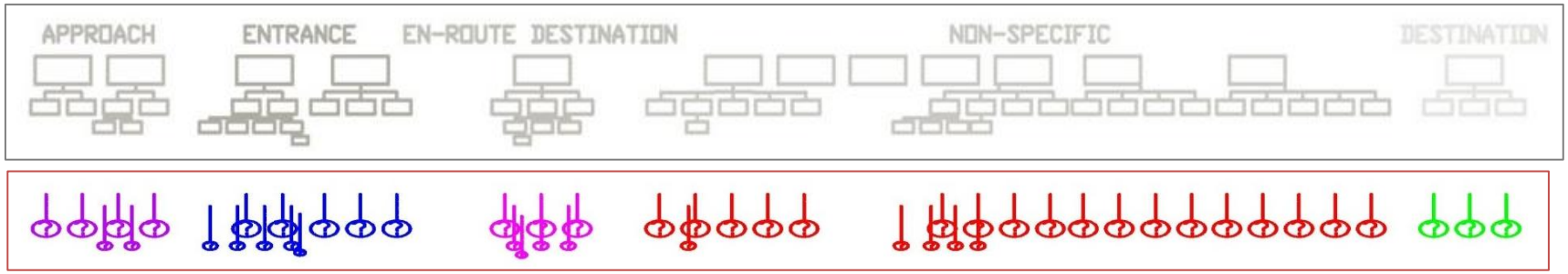


Figure 3.28: Task Components highlighted a Communication Requirement

There were five types of Communication Requirement which emerged: Identification Orientation, Navigation, Warning, and Instruction.

The process of this whole analysis of way-finding data is illustrated in figure 3.29.

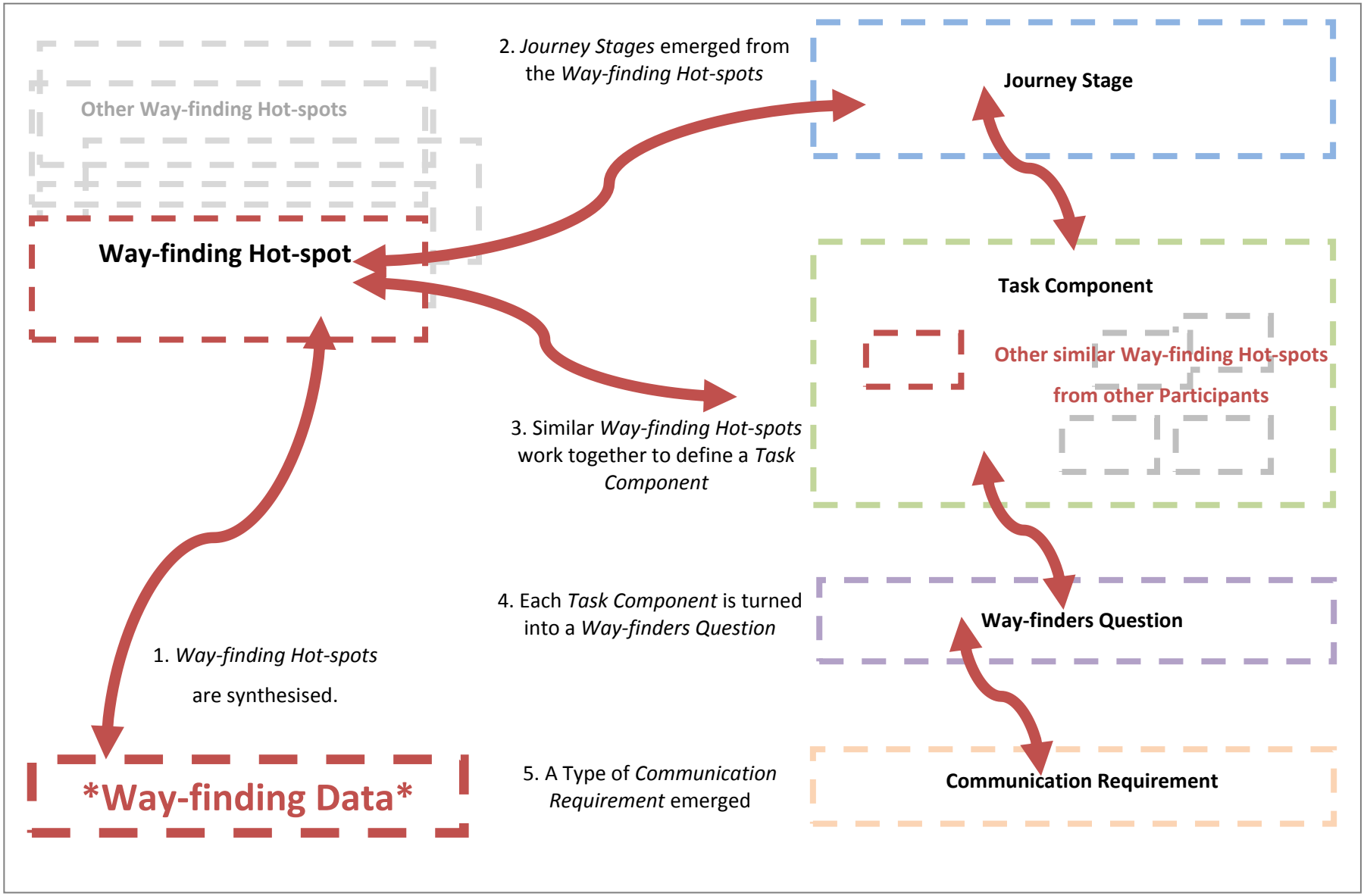


Figure 3.29: Cycle of Way-finding Data Analysis

3.6 Step 6 Research Principles: Use and Reflection

The Research Principles adopted in this study were originally outlined and defined within Step 3. In this section the application of the *Research Principles* will now be reflected upon. Two main questions were asked of each principle: *Does this project meet these principles?* and *How did they guide it?*

Reflection: 1. Building a Theoretical Description

The Researcher did not begin with a pre-conceived hypothesis. Instead, a set of themes which fuelled an intensive literature review, were the starting point in focusing the research and developing the research question.

The research themes were:

1. Experience of Way-finding in large Public Buildings [by]

2. People who have a Range of Visual Ability

In furthering the Researcher's role to acquire a thorough understanding of the field (Robson, 2002), the Researcher spent a considerable amount of time immersed within the literature discussed within Chapter 2.

In forming this academic knowledge base a gap in the knowledge was recognised: There are few evidence-based studies of way-finding in a building. Furthermore, there are no studies of real-life experiences of way-finding, undertaken by real-life Participants with a range of visual ability within the context of a real-life building.

Therefore, this study's objective was to investigate way-finding in a large public building as undertaken by Participants who had a range of visual ability. The research questions became:

- What are the design issues revealed by Participants who have a range of visual ability as they way-find in a large public building?
- What is an appropriate Methodology and Set of Methods to investigate experiential components of way-finding suited to people with limited visual ability?

These questions and themes fuelled the pursuit to generate theory from the ever evolving activity of collection, collation and analysis of data.

Reflection: 2. Working in a Real World Context with Participants

This Study was *Real-World* in two main ways:

1. The setting

This study took place with the context of a real-life, large, public building. This allowed insight to be gained into the experiences of someone way-finding in a real building.

Although the task was simulated [i.e. the Participant was not attending a 'real' meeting] the real encounters with the real building, real people, and real experiences could be captured. This simulation aided the *real-worldn*ess of this enquiry.

2. The Participants

This research's objective was to explore way-finding by people with visual loss. It was evident from the beginning of this research that input from Participants with varying visual ability was vital.

In Chapter 2, three Models of Disability which provide a framework for understanding disability were introduced: The Medical Model of Disability and the Social Model of Disability (Oliver, 1990) and the Architectural Model of Disability (Goldsmith, 1997).

The Researcher adopted the Social Model of Disability (Oliver, 1990), when dealing with the Participants and the Architectural Model of Disability (Goldsmith, 1997) when dealing with understanding the Way-finding Journey. In adopting the Social Model of Disability (Oliver, 1990), the study focused on disabling and enabling societal implications. It also remained focused on the Participant's self-definition of their visual ability as opposed to adopting medical definitions. In adopting the Architectural Model of Disability full awareness was drawn to the experiences of taking part in the Way-finding Journey. Through adopting this second paradigm the focus of the research was changed. The focus became solely placed on the Architecture. However, it did not just focus on the disabling and negative experiences which the Architectural Model of Disability is concerned with. It also explored the enabling and positive experiences as its mission was to depict the holistic experience of the Way-finding Journey.

Reflection: 3. User Centred - Participants Generate Data

From the outset this research was formed around the concept that Participants with varying degrees of visual ability would become involved. The involvement of people determined that moral and ethical issues had to be assessed and the Researcher was aware that data protocols needed to be considered and followed. This was an extremely important principle in terms of this research. The Researcher was always aware of ensuring that the Participants would be protected [to her best ability] from harm or discomfort.

Working with and gathering data from, 1. human participants and 2. people who had forms of visual loss [and therefore deemed to be a vulnerable group] were the two factors that raised ethical concerns. These issues were identified and addressed by the Researcher through an ethical application which was submitted [17th December 2008] and formally approved by the University of Dundee Research Ethics Committee (UREC) on the 24th

February 2009. [All documentation and correspondence regarding the ethical application process can be found in Appendix D]

In addition to following guidelines set out by the University of Dundee's 'Code of Practice for Research on Human Participants' and 'The British Psychological Society Ethical Guidelines: Guidelines for minimum standards of ethical approval in psychological research '(July 2004), further measures were taken by the Researcher throughout various stages of the research to ensure that wherever possible, all parties [i.e. the Participants, the University and the Researcher] were protected and kept informed throughout the entire research process. A major strength of this research is that it overcame a variety of challenges in terms of ethical protocol. In addition to applying for ethical approval and data registration the research took additional measures: *During the Ethical Process, Before Recruitment, During Recruitment & User Group Meetings, Before the Meetings, During the Meetings, and After the meetings.* These additional considerations will now be discussed.

Additional Considerations: During Ethical Process

During the period of applying for ethical approval and in order to draw on expertise and experience in working with people with a range of impairments, advice [regarding ethical procedures, content and format] was sought from a range of individuals, organisations and charities.

Additional Considerations: Before Recruitment

To ensure that all information was accessible, each Participant document [i.e. Consent Form, Participant Information Sheet and Debriefing Form] was transcribed into a format which was decided on by each Participant [i.e. Braille, audio transcription, and large text]. The Royal Institute for the Blind publication, 'See it Right: Making Information Accessible for people

with visual sight problems' (Royal National Institute for the Blind, 2006) along with University of Dundee Disability Services were consulted during this period of documentation preparation. These measures ensured that the Participants understood their role in the research. It made sure that each Participant was able to give informed consent and it ensured they were aware their confidentially would be protected at all times and that they could withdraw their participation, or their data from the research at any stage.

Additional Considerations: During Recruitment & User Group Meetings

In order to prepare, engage with and recruit Participants, the Researcher carried out a stage of planning to acquire new skills, training and contacts. Taking part in various courses and conference workshops which explored orientation and mobility of people who were blind or partially sighted provided the Researcher with basic understanding of orientation and mobility training, as well as the confidence and skills to engage and communicate appropriately with people with visual loss. [Details of this specialist training along with generic training can be found within Appendix G].

Various charity user groups were attended by the Researcher during the process of Participant recruitment. People attending these meetings had varying forms of visual loss in addition to other sensory and physical impairments. It quickly became apparent that communication, especially with those who were deaf and also had a form of visual loss, would be a challenge. To help mitigate this, the Researcher enrolled in a Sign language Course. This enabled her to build a basic British Sign Language vocabulary. This new skill was found to be vital in order to communicate [on a very basic level] with those people who were deaf but also had a form of visual loss. Although conversations couldn't be held without an interpreter, this training provided the Researcher with an 'ice-breaker' and was a way to engage with and include everyone in the user group.

Participant Recruitment – Methods

Participants were recruited from a variety of sources including user-groups and conferences as well as with advertisements placed within the University's weekly email to students and staff, Talking Newspapers and through networking with UK based sense loss charities such as: RNIB, SENSE and SENSE Scotland, Dundee Partially Blind Society, Deaf-blind Scotland and Visibility Scotland.

The Researcher was pleasantly surprised at the response and keenness of people who had visual loss who wanted to become involved. Although not all respondents wanted to take part in the study they were all keen to talk about their experiences of way-finding in buildings. These conversations were important in the beginning of the research as they gave the Researcher insight to create the Way-finding Scenario.

Additional Considerations: Before the Meetings

Post-recruitment, and previous to the Way-finding Scenario meeting, Participants were consulted in regard to their preferred format of information material. The standard text document was transcribed into both large print and Braille at the request of Participants involved with this study.

Disability Services at the University of Dundee transcribed Participant's documents into Braille. An information package consisting of Participant Information Sheet, Consent form and Debriefing form along with the Researcher's contact details and directions to the meeting place on the day were posted to the Participants and meeting dates were arranged.

In some cases the Participants were relying on the availability of a third party to accompany them to the meeting therefore the Researcher had to be flexible regarding meeting dates. The Researcher ensured that there would be no fire-drill during the Participant's visit.

Additional Considerations: During the Meetings

On meeting the Participant, refreshments were offered and introductions were made before briefing of the research project [based on the Participant Information sheet] was given by the Researcher. Any questions the Participant had were answered before the consent form was signed by both parties. During this time each Participant was reminded that they could withdraw their participation or their data at any time. A Signature Guide was provided by the Researcher to ensure that all Participants would be able to sign the consent form. [Full Details of the Way-finding Day can be found in Appendix A].

Additional Considerations: After the meetings - Debriefing

Debriefing took place in the Researcher's office on the conclusion of each Way-finding Scenario. This enabled the Researcher to reiterate the main factors about the investigation; state again that participation was voluntary and that the Participant could withdraw their information/data without any penalty and for any reason at anytime. With refreshments, the objective of the debriefing session was to ensure that the Participant was not distressed in anyway and that there would be no long terms effects of the research. The Researcher was always conscious of restoring the Participant to the same frame of mind as they were in when they were first arrived. The Participant was given the Researcher's contact details to ensure that [if they needed to] they could contact the Researcher after the Way-finding Scenario meeting.

Additional Considerations – After the Meetings and Exit Strategy

In relation to ethical approval, appropriate measures were taken by the Researcher [post-Way-finding Scenario] to protect the confidentiality of the Participants as the data was analysed. Before presenting data and findings, Participant data went through a process of

anonymity to protect their identities. The Researcher also ensured that the research complied with the data protection regulations. The Data Protection Act 1998 governs the way that personal information is held and used and protocol regarding the data from this research was followed. The registration of this research, under the University of Dundee's notification with the Office of the Information Commissioner regarding the use of personal data as regulated by the Data Protection Act 1998 is covered by the University's notification under Section 6, Research. The data was only used for the specific purposes it was collected [i.e. this PhD study] and has not [will not] be sent outside the European Economic Area. Data was not [and will not] be disclosed to other parties without consent from the Participant[s]. Each Participant had [and has] the right to access the information they provided during the Way-finding Scenario.

Each Participant's personal information will be kept for five years and then destroyed. The body of data is [and will remain] registered with the University of Dundee. The data regarding personal information is [and will remain] securely stored and precautions have been taken by the Researcher to ensure that data will not be lost or damaged. Each Participant was reminded at various stages throughout the Way-finding Scenario that they could withdraw their input. They were also reminded that they could withdraw their data at any stage after the Way-finding Scenario. The Researcher ensured that each Participant had her contact details to ensure they could action this withdrawal. So far, no Participant has wanted to withdraw their data from the study. [All documentation and correspondence regarding data application process can be found in Appendix E].

While the Researcher ensured that all contact and communication with the Participants was handled in a sensitive manner [e.g. all Participant emails, texts and phone calls were answered] there was no formal exit strategy employed to end the Researcher/Participant

relationship. It was found that participants in this study were keen to be kept updated on the progression of the study and also expressed an interest in becoming involved in future projects. There was however, a natural termination of communications between some of the younger participants and contact came to a natural conclusion after completion of the Way-finding Scenario day. A final communication – an executive summary of this study - will be sent to all participants to conclude this research. With hindsight the Researcher recognises that a formal exit strategy could be useful when dealing with a larger sample group and should be considered, tested and defined in future studies.

Reflection: 4. Taking Cues and connecting with the Literature

This principle was valuable throughout the whole process of carrying out this research. It was a constant activity. In the initial stages of this research a period of complete immersion in the literature enabled the area of study to become focused and refined. However, a constant 'dipping' into the literature aided in crafting and moulding the entire study. This principle of engaging and learning from literature aided the Researcher to 'know appropriate aspects on which to gather information' (Robson, 2002,p. 59).

The literature was also used to stimulate 'theoretical sensitivity' (Glaser, 1968). It aided the Researcher in directing the theoretical sampling [i.e. the Participants and the Questions of Phase 1 and 3 of the Way-finding Scenario] and was utilised again as supplementary validation of findings within: Chapter 4 - Discussion, Analysis and Findings, and Chapter 5 - Findings Conclusion and Chapter 6 - Post-Conclusion & Critical Reflection.

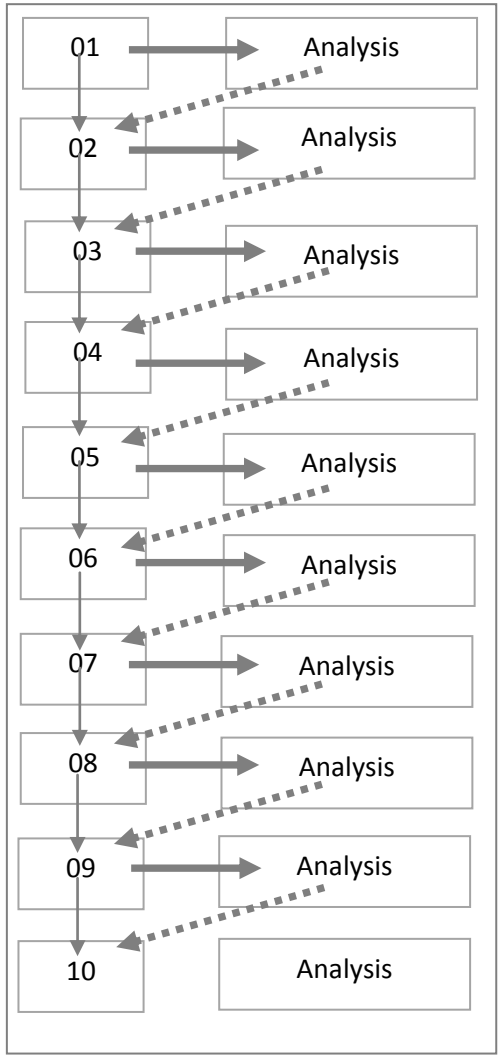


Figure 3.30: The Iterative Case Study

Reflection: 5. Data Collection and Analysis is an Interrelated Process

The activity of constant iteration was absolutely essential in developing: the phases of the Way-finding Scenario, the process of analysis and the coding. It was found to be a helpful principle and ensured that the Researcher remained connected with the data, the categories and codes which emerged and provided a period of reflection and refinement of the design of enquiry.

In this research the 'case' was a Way-finding Scenario. The study was an iterative Case Study. It became a series of Way-finding Scenarios. Each Way-finding Scenario and its data collection and analysis influenced the next case, which influenced the next and so on. It was used to gain an understanding of how Participants, with a range of visual ability, find their way in real world situations and observe how they 'make sense' of way-finding through their surrounding environments. Exploratory in nature, the Researcher was continually developing understanding of an unknown field.

In following this principle the Case Study evolved. Although the case studies are closely related, they developed each time they were carried out [design and analysis]. In a sequence of ten, the first Case Study influenced the next and taken together, influenced the next [figure 3.30]. The analysis builds them together and they are influenced by each other. The Researcher was always aware of remaining open and flexible to making alterations and changes as the study progressed (Strauss and Corbin, 1990).

Reflection: 6.Purposive Sampling

The sample was purposeful in two ways: the Participants and the line of questioning/prompts used in the Purposeful Conversations.

The sampling of Participants was purposeful. Each of the Participants who took part in the research was selected to aid with the line of enquiry. Participants were approached in different ways so that different age groups and people with different forms of visual impairment could be connected with. Participants, aged 18+ were invited to take part and special attention was paid to ensure that Participants with a range of visual impairment became involved. A lot of sighted people and people whose sight was corrected by wearing lenses wanted to take part however, they had to be turned down to ensure that people with various visual abilities [i.e. less visual ability] became involved. One person with no visual impairment was selected to ensure that aspects of vision-loss in relation to way-finding could be explored. Each Participant was selected to test and strengthen the theory. The Researcher gained new insights through each Participants' Way-finding Scenario. Time and resource restrictions impacted on how many Participants could be seen and in the end, a sample size of ten Participants took part.

In the beginning, and as a practice of the Way-finding Day, a fully sighted Participant undertook the Way-finding Scenario. This practice run aided the Researcher with logistical elements of the day such as: testing the suitability of the recording equipment, the process of recording and storing data, and trial the running order of the Way-finding Day. It was also utilised to evaluate appropriateness of the Way-finding Scenario and the Way-finding Task Setting. This data did not form part of the Participant Data Bank as it was a practice-run of the Way-finding Day. [This practice-run does not contribute to the findings of this research].

Rich insight was gained into the way-finding experiences of these Participants. This was greatly aided by the Purposeful Conversations of Phase 1 and 3 and the subsequent line of questioning which evolved. The line of questioning/prompts used in the Purposeful Conversation was also used to test and evaluate the evolving theory.

In the beginning the Researcher – armed with her literature review – had rough ideas of how the Purposeful Conversation of Phase 1 and 3 should progress. She had, on the first Way-finding Scenario Day, a list of conversation prompts. However, after transcribing and analysing the first data set, themes and concepts – the first ideas of building the theory - emerged. The lessons learnt from the first conversation influenced what the prompt list became in the second conversations which influenced the next and so on. The application of this Principle was found to be very successful, each of the Participants and their Conversations aided with the line of enquiry. A full record of the conversation prompts can be found in Appendix A.

Reflection: 7. Data Collection must work to uncover way-finding experiences

Way-finding is always based on both past experiences and current experiences (Lynch, 1960). Therefore both types of experience have to be investigated. However, previous Researchers (Arthur and Passini, 1992;Golledge, 1999;Downs and Stea, 1977) have highlighted the difficulty way-finders have in expressing way-finding experiences which are largely internalised and difficult for Researchers to extract.

A multi-method approach was adopted and utilised purposeful conversation (Burgess, 1982) [Phase 1 and 3] and an observed way-finding task [Phase 2]. These methods enabled rich insight to be gathered based on Participants' experiences of Way-finding within a public building. The application of this principle did successfully provide data relating to collection

of experiences, thoughts, forms and extents of contextual interaction in relation to way-finding experiences. Data based on both memories of way-finding experience and current way-finding experience was captured.

Reflection: 8. Analysis: Coding and Categories emerge from the Data

In being nervous of the idea that codes would not emerge from the data – the Researcher does have a confession to make. In the beginning she drew on other schema from the Way-finding Models and even building legislation, outlined in the literature review. As a young Researcher, in the initial phases of data collection, this provided a start. However, it was quickly realised that this process was not going to work. Data could not be forced into pre-constructed codes and so this schema was quickly disregarded.

During the data collection and the iterative processes coding did emerge which informed the next case study and the next. Each set of data was coded as soon as it was produced. As the data collection and coding evolved, the codes, memos and diagrams accumulated. This process of using memos and creating new codes and categories whilst testing others is illustrated in figure 3.31.

Through this process of coding, the theory of a Way-finding Journey emerged. In this evolving process and as partially illustrated in figure 3.15 and figure 3.21 the program Atlas enabled the Researcher to keep a record of memos, notes and codes.

The full analysis and coding of this study is fully described in Step 5.

Reflection: 9. Making, Producing and Evolving

The Researcher kept a reflective sketch-book and evolving set of diagrams [figure 3.31]. These were used to capture, analyse, generate, compare and contrast between ideas, thoughts, emerging concepts and theory. This process was vitally important to the Researcher and has greatly aided both the charting and the progression of all elements of the PhD.

A 'mapping tool-kit' of coloured pens, sketch books, rolls of paper and post-it notes, was used, from conception to completion and beyond, to map the research. The complicated nature of the research became constructed, organised and structured through using memos, diagrammatic matrixes and mapping. This method enabled the Researcher to visualise the research as a whole as well as delve into the specific micro components. It became a vital tool which enabled the Researcher to use her skills as an architectural designer to think creatively and quickly, sketch and test ideas, refine components of the research, organise ideas as well as reflect on and develop coding and analysis. It provided a means to engage others with the research. Narrative Simulations, used within Chapter 4, enabled the Researcher to understand and disseminate participant experiences to others.

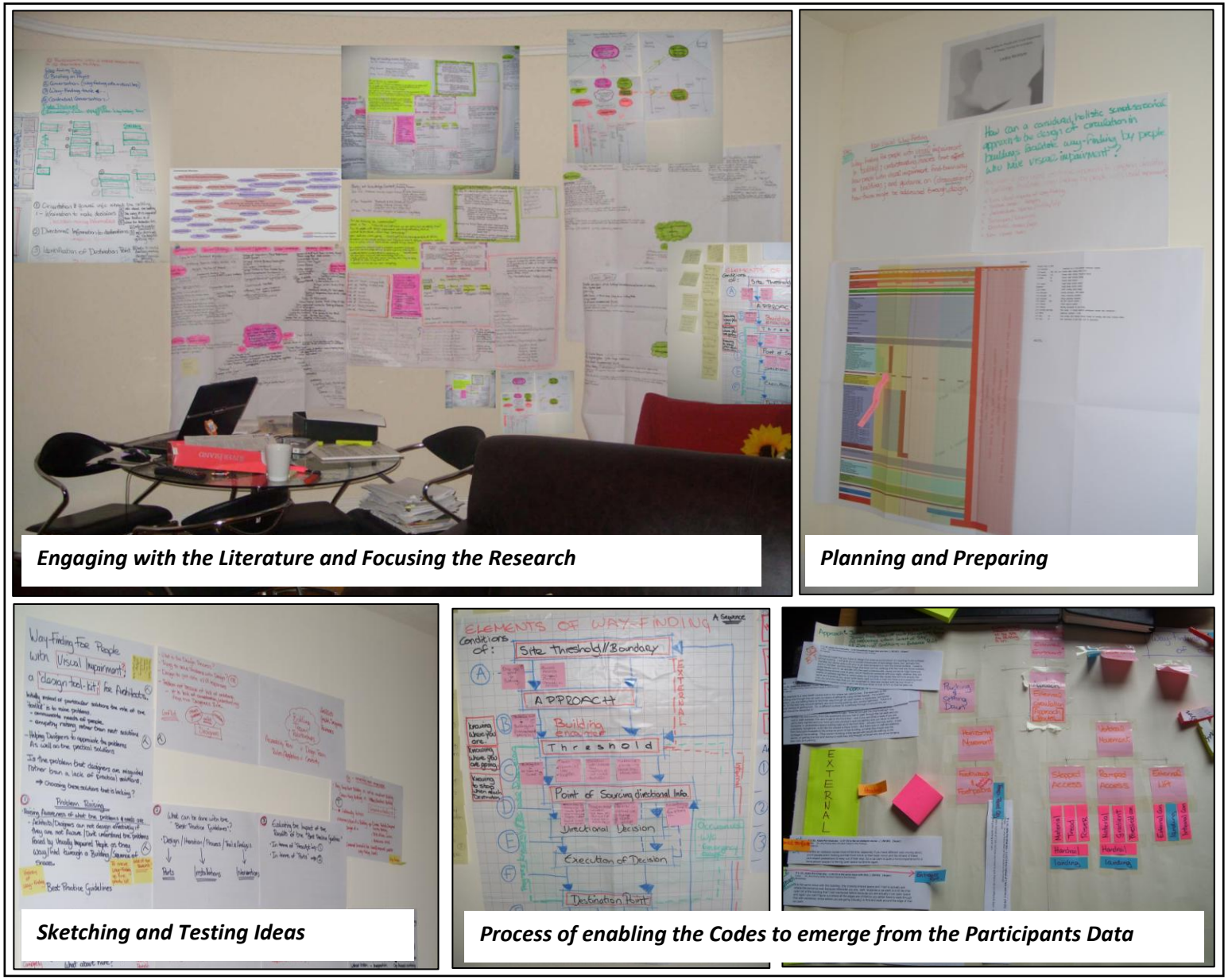


Figure 3.31: Making, Producing and Evolving

Reflection: 10. Working with Others

Working as a sole Researcher can at times, be extremely frustrating. Coming from a background of working within the design studio, this principle was found to be extremely important to the Researcher's confidence in developing and testing the research codes with others. The Researcher presented her work and ideas both formally within the context of the conference and seminar environment as well as informally with fellow research collegues. [Details of seminars, workshops and conferences can be found in Appendix F and G.] In accordance with Corbin and Strauss (1990) this activity has increased the Researcher's sensitivity. All aspects of this study were developed and strengthened through conversation, arguments and 'read-through' sessions with other researchers, architects and academics.

Reflection: 11. Theory is validated by empirical data

This work was grounded in the empirical data. Codes and categories emerged from each set of data which was generated by the Participants. There was a lineage of categories which then built the theory of a Way-finding Journey. Way-finding Hot-spots emerged from the Way-finding Scenario. The Way-finding Hot-spots occurred within a Journey Stage. Task Components emerged from the Way-finding Hot-spots. Finally, Way-finder's Questions highlighted a Communication Requirement. This establishes the empirical validity of the study.

Just as for Curtin and Clarke (2005), the collaboration between the Researcher and the Participants helped maintain the 'integrity', 'credibility' and 'trustworthiness' of the way-finding experiences which have been described.

Reflection: 12. The research is progressed in a reflexive way

In always remaining aware that personal influences impact on how a study progresses the Researcher has, on numerous occasions, presented various stages of her work to both peers and other academics at conferences, workshops and seminars. [Details of this can be found in Appendix F and G].

There was of course a response to reflexivity. The study grew and changed as the Researcher grew. The Researcher used these settings to reflect on processes, debate decisions and in some cases – return to the drawing board. Sharing and testing this research was an extremely important element of this research.

Reflection: 13. The research process is transparent

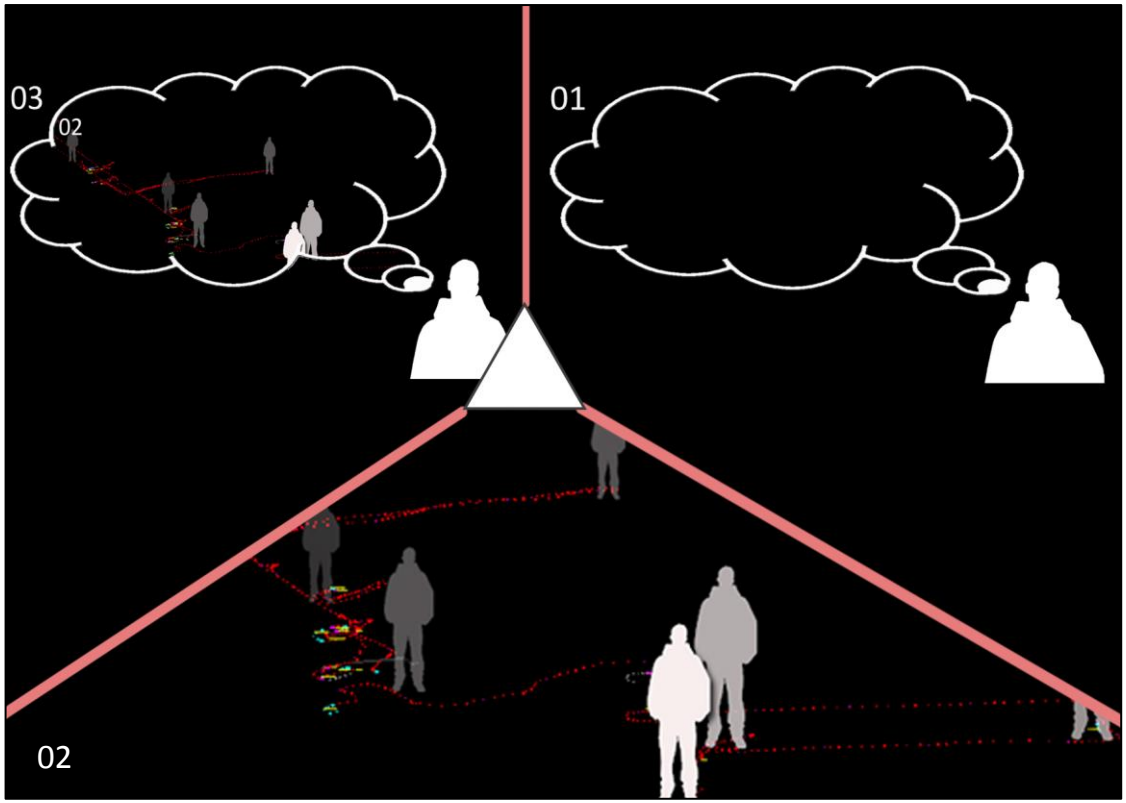
At every stage of recording this research process the Researcher has been careful to capture all details. This process was carried out throughout the study from: mapping the literature review, to establish the methodology and creating the method right through to analysing and concluding. The successes and limitations of this research are reflected on in the final Chapter. The adequacy of the research process can be judged.

Reflection: 14. Triangulation of Methods

Internal validity is often achieved through triangulation (Wisker, 2007). Triangulation is when more than one method is used within a study (Robson, 2002). In this research, Method Triangulation was employed within the Phases of the Way-finding Scenario [figure 3.32]. The effect of this was that data could be validated, checked and tested.

Phase 3 Purposeful Conversation:

Experiences of the Way-finding Task [Phase 2] and Memories of past Way-finding Experiences



Phase 1 Purposeful Conversation:

Memories of Way-finding Experiences

Phase 2 Way-finding Task: Way-finding Trace

Way-finding from a Starting point to a Destination point in a Large Public Building

Figure 3.32: Triangulation of Methods

Reflection: 15. Findings are Transferable

The pursuit of transferability did affect the process of the research. A limitation inherited from Case Study Analysis (Yin, 2003a;Yin, 2003b) was that the findings evidenced from the Ten Way-finding Scenario Case Studies may not, in their entirety, be applied to other contexts. This is because each experience of a Way-finding Journey is unique to that person, in that time, in that setting.

During the period of evolving the Way-finding Scenario this limitation was taken into consideration and Phase 1, and partly Phase 3, were designed to lessen this limitation. These Phase[s] of Purposeful Conversation (Burgess, 1982) enabled Participants to talk at length about their way-finding experiences in other buildings. Therefore these other context way-finding experiences extended the conceptualisation of a Way-finding Journey beyond the limits of Phase 2 – way-finding within the case study building.

The majority of findings can be generalised, for example: The Journey Stages – every visit to a building starts with a stage of Approach which continues to an Entrance which continues to a Destination [with also perhaps an En-route Destination of visiting the toilet] and there is always the Non-Specific experiences of way-finding such building elements of stairs, etc. The Case Studies of Way-finding, the hierarchy of Journey Stages, Task Components and Communication Requirements which emerged from the data can be transferred into other contexts.

3.7 Chapter Summary

This Chapter has demonstrated the purpose and rationale of the methodology and methods employed by the study. A series of Six Research Steps were formulated to guide the design of the research enquiry. A summary of each Step is illustrated in figure 3.33.

In Step 1 the ontological position of constructivism [as opposed to objectivism] and the epistemological paradigm of post-positivistic were established. The study is exploratory and descriptive in purpose. It is inductive and qualitative data generated by a multitude of methods provided the evidence in generating a new theory.

In Step 2 the research approach and research design process was described and in Step 3, Research Principles of this research were generated, and described in relation to Grounded Theory (Glaser, 1968), Case Study (Yin, 2003a;Yin, 2003b) and other methods used in research and practice.

In Step 4 the fundamental components of the Way-finding Scenario [composed of three phases] were defined. In Step 5 the continual evolution of the process has been presented along with the theoretical categories of coding which emerged. Finally, in Step 6 the use of the Research Principles [originally outlined within Step 3] were reflected upon.

The following, Chapter 4: Discussion, Analysis and Findings, provides discussion of the analysis and findings which have been evidenced from the three phases of Way-finding Scenario and were undertaken by ten Participants with varying degrees of visual loss. The discussion, through a hierarchy of coding, presents the five Journey Stages [Approach, Entrance, En-Route Destinations, Non-Specific and Destination]. Each Task Component [and sub-tasks] along with Communication Requirements will be discussed, analysed and presented.

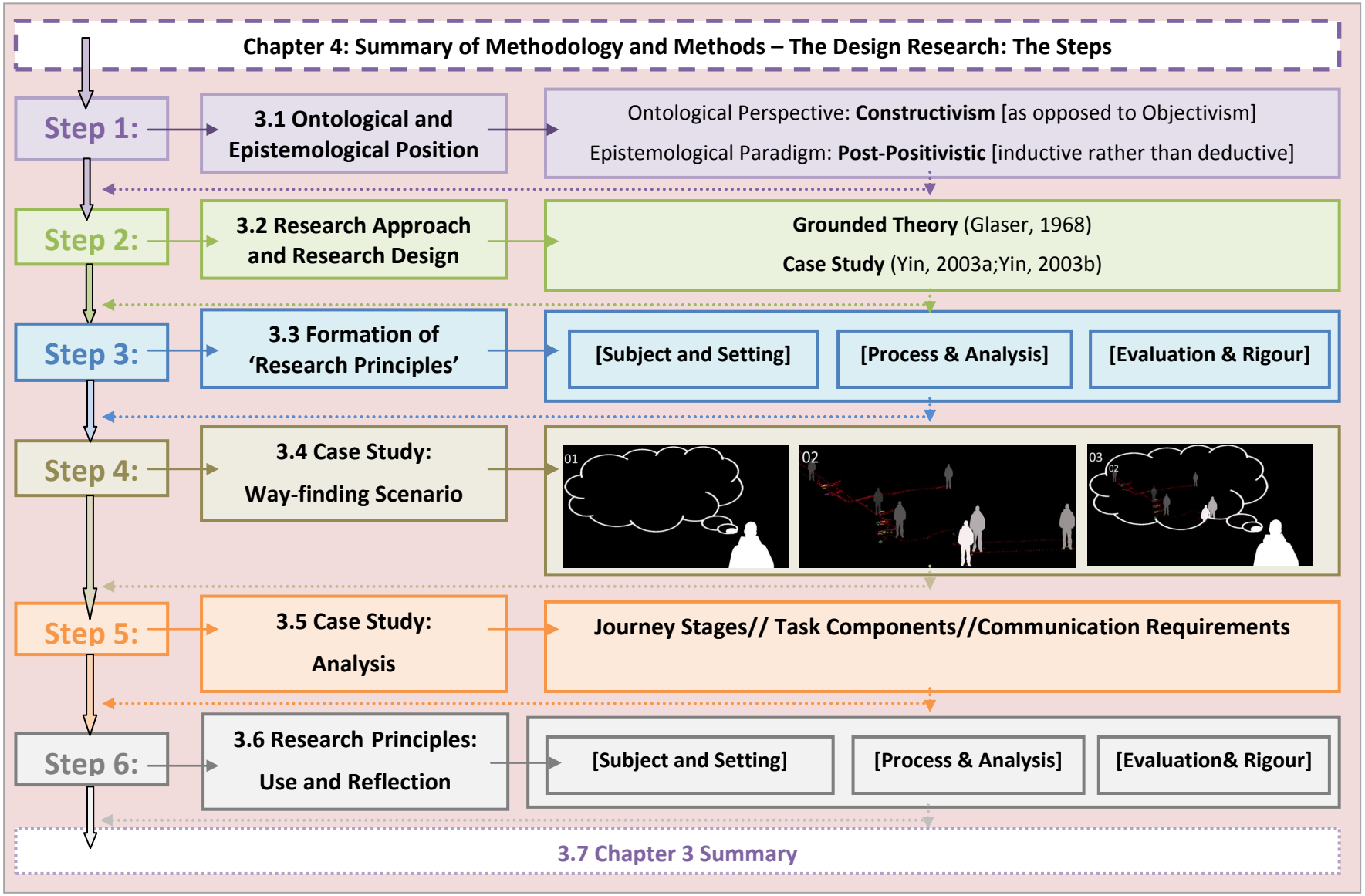


Figure 3.33: Summary of the Methodology and Methods Chapter

Chapter 4 Discussion, Analysis & Findings

‘Let me show you what happens as I try to get from A to B’

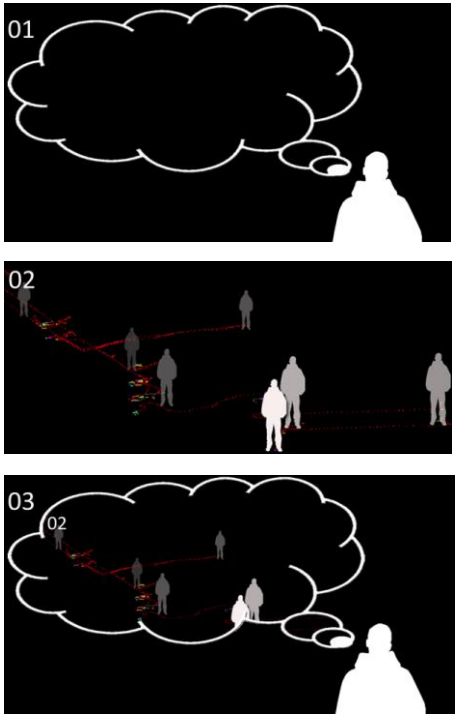


Figure 4.1: The Way-finding Scenario

4.0 Chapter Introduction

This Chapter documents the analysis and discussion of findings in relation to two data outcomes: *Participant Profiles* and the *Experiential Charting of a Way-finding Journey* [composed of participant experiential narrative]. Descriptive in nature, its purpose is to illustrate the generation of new knowledge, principally the experiential components of a Way-finding Journey. The outline of this Chapter is illustrated in figure 4.0.

Section 4.1 establishes the context of findings through a summary of the Participant Profiles.

Section 4.2 discusses the Theorisation of a Way-finding Journey which has been divided into Journey Stages. All data evidenced has been the result of ten Participants with varying degrees of visual ability undertaking a Way-finding Scenario [figure 4.1]. Way-finding experiences, defined as Way-finding Hot-spots, have been analysed and categorised into Task Components and Communication Requirements. Discussion of each Journey Stage is introduced by a table of contents illustrating the hierarchy of findings which form the research outcome – *The Experiential Charting of a Way-finding Journey*.

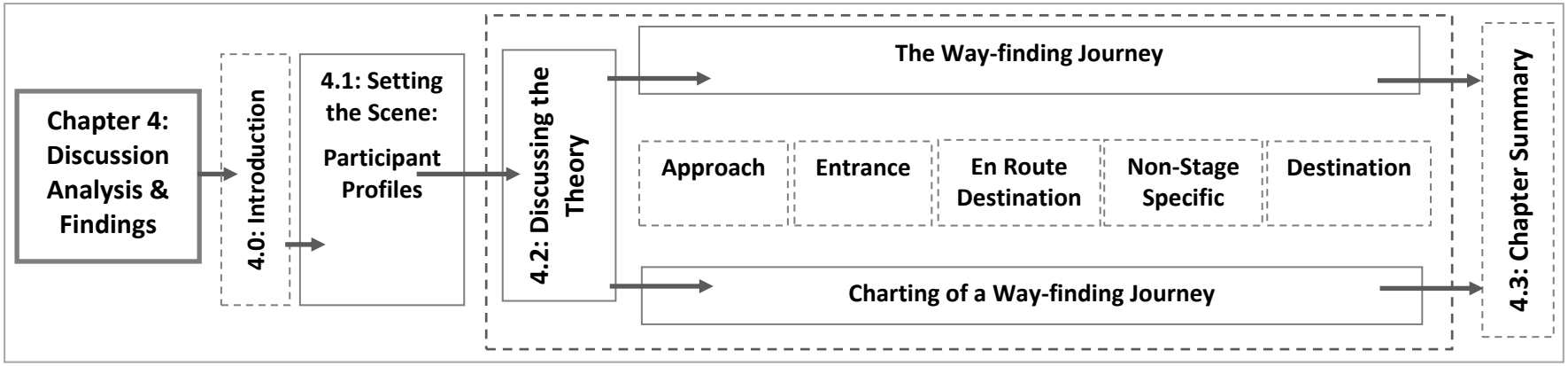


Figure 4.0: Chapter Outline

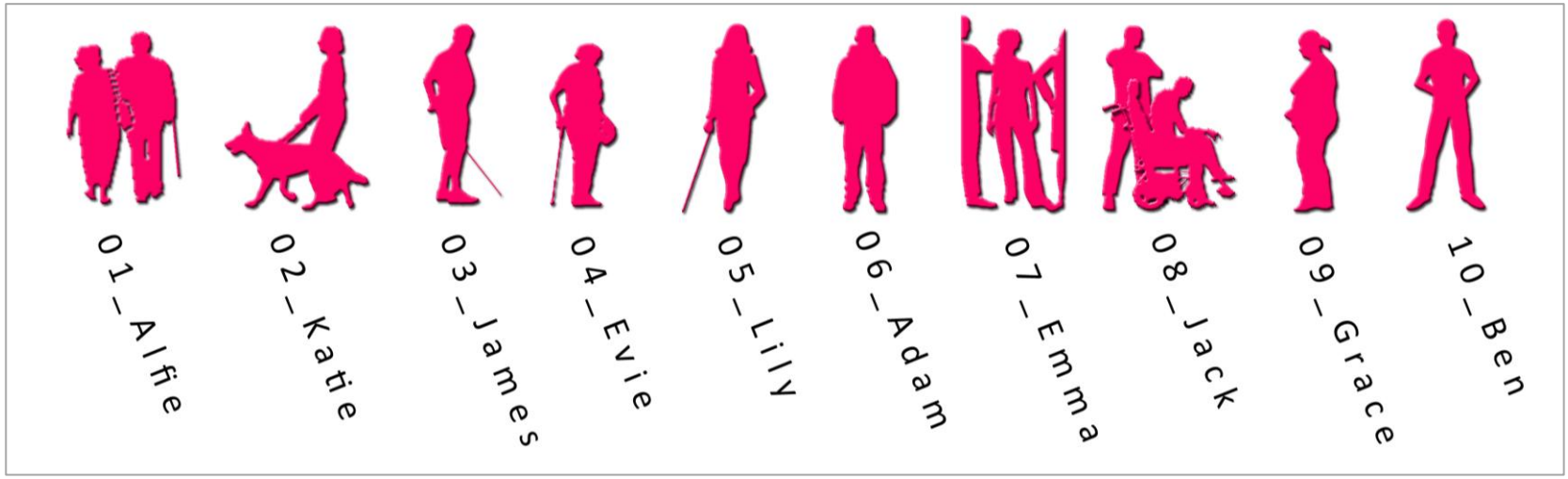


Figure 4.2: The Participants

Figure 4.3: Thumbnail of Participant Profiles [Appendix B]

4.1 Setting the Scene: Participant Profiles

Ten Participants [figure 4.2], consisting of five males [pseudonyms: Alfie, James, Adam, Jack and Ben] and five females [pseudonyms: Katie, Lily, Evie, Emma and Grace], took part in the Way-finding Scenario.

Participants are introduced in Table 4.0 through summary of the prominent themes which emerged from data regarding: Participant Details, Self-definition of Visual Ability, Way-finding Aid, Orientation and Mobility [O&M] Training, Preferred Reading Format.

Individual Participant Profiles [figure 4.3] and a descriptive summary of Table 4.0 can be found in Appendix B.

Participant Details		Self-definition of Visual Ability	Way-finding Aid	O&M Training	Braille / Text/ Audio
 **Alfie**	Age: 60-70 Age of Visual Loss: 55 years old	*'I am in total darkness all the time [...] I can see nothing'*	Symbol Cane [Image in Appendix B]	No	Audio
 **Katie**	Age: 40-50 Age of Visual Loss: 21 years old	*'Totally blind'* *'I have no useful sight at all when I am out and about'*	Guide-Dog [Bruno]	Yes	Braille
 **James**	Age: 50-60 Age of Visual Loss: *'Blind since birth'*	*'Registered Blind [...]* *'My sight has stayed the same as it always was'*	Roller Cane [Image in Appendix B] *'You can feel the whole surface area on the ground.'*	Yes	Braille
 **Evie**	Age: 60-70 Age of Visual Loss: 50 years old	Degenerative sight-loss Peripheral vision Sensitive to light Double vision	Currently: Sliding Cane Future: A Guide-Dog.	Yes	Audio
 **Lily**	Age: 30-40 Age of Visual Loss: *'I started to lose my sight when I was 13 [...]. At 21 it got worse'*	Degenerative sight-loss. *'I can only see things that are really close to my face.'*	White Cane	Yes	Audio

Table 4.0: Participant Summary Table/01

Participant Details		Self-definition of Visual Ability	Way-finding Aid	O&M Training	Braille / Text/ Audio
 **Adam**	Age: 20 Age of Visual Loss: Genetic Condition Since Birth	Degenerative sight-loss *'no working iris'* sensitive to light *'[...] quite short-sighted and registered partially sighted'*. Wears prescription lenses.	No Aid	Yes	Large Text [Size 16 +]
 **Emma**	Age: 20-25 Age of Visual Loss: 4 years old	No vision in her left eye Small amount ['10%-15%'] of vision in her right eye.	Long Cane or an *'occasional borrowed elbow of a friend'*	No	Audio
Jack 	Age: 20-30 Age of Visual Loss: not defined	Cannot see anything using his peripheral vision. *'I can only really see straight ahead.'* Wears corrective lenses and uses a wheelchair.	Dave, [Jacks Assistant] helped him with daily tasks such as getting around buildings.	No	Large Text [Size 16 +]
 **Grace**	Age: 40-50 Age of Visual Loss: not defined	*'I am either short or long sighted'* Sight-loss corrected with lenses.	No Aid	No	Text
 **Ben**	Age: 20-30 Age of Visual Loss: N/A	*'no visual loss at all'*	No Aid	No	Text

Table 4.0: Participant Summary Table/02

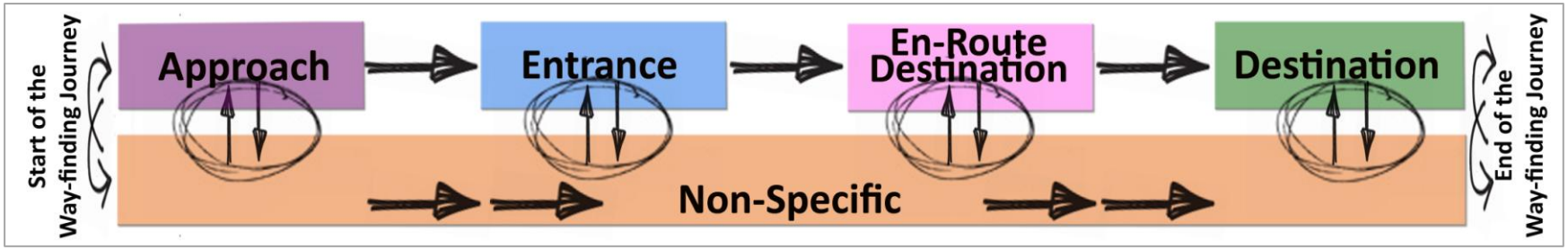


Figure 4.4: Journey Stages

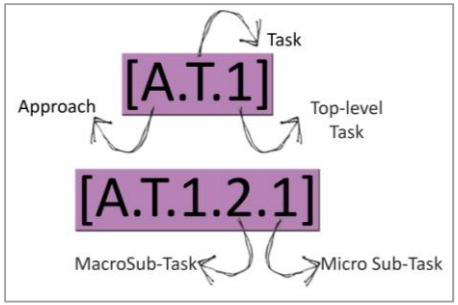


Figure 4.5: Task Component Numbering System

[A.T.1] [E.T.1] etc. should be read as *'The Approach Task/Entrance Task of...'*

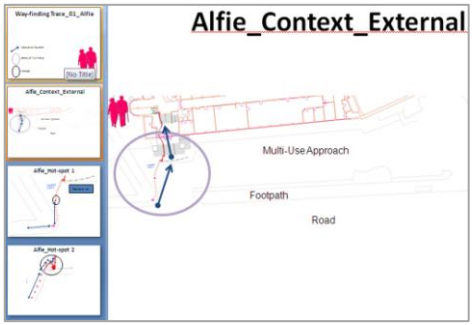


Figure 4.6: Thumbnail of Way-finding Trace [Appendix C]

4.2 The Way-finding Journey

This section presents the *Experiential Charting of a Way-finding Journey.*

Through analysis of Participants' data, generated from the Way-finding Scenario, a series of Way-finding Hot-spots were evidenced as occurring within four distinct Journey Stages [Approach, Entrance, En-Route Destination and Destination] and throughout the Way-finding Journey as Non-Specific [figure 4.4]. These Journey Stages form the structure of a discussion focused on the *Experiential Charting of a Way-finding Journey.*

Each Journey Stage is introduced by a summary table which provides an overview of Task Components [evidenced by the Participant's Way-finding Hot-spots] and Communication Requirements which were uncovered during the analysis.

The summary tables and discussions which follow are hierarchical and present top-level Task Components, sub-tasks, and Communication Requirements. Figure 4.5 provides an explanation of the task numbering system used in developing the hierarchy of these findings.

Each record of Participants' Way-finding Trace evidenced from Phase 2: Way-finding Journey [figure 4.6] can be found in Appendix C.

4.2.1 Journey Stage

Approach

Specific to the building curtilage [i.e. the external conditions around a building], Journey Stage: Approach, consisted of Way-finding Hot-spots which occurred between arrival at the site boundary and reaching the building entrance.

Within Approach the term *Multi-use Approach Route* requires introduction. Different from 'The Guide Dogs for the Blind Association's' concept of 'Shared Streets' (Thomas, 2006,p. 57), Multi-use Approach Route is used in this study to describe the conditions of a building's semi-private curtilage, as opposed to a public street context. It is the external land immediately surrounding the building and is an area used for both pedestrian and vehicle activities [e.g. a car-park, bicycle storage, drop-off and pick-up area, area for deliveries, a vehicle turning zone, whilst also used by pedestrians to get to the building entrance].

Using Table 4.1 as a summarised guide, the hierarchy of Task Components and Communication Requirements evidenced within Journey Stage: Approach is now discussed.

Journey Stage		Task Component [Way-finding Hot-spot]	Communication Requirement [Way-finders Question and Communication Need]	
Approach				
	[A.T.1]	**Arrival and Threshold**		
	[A.T.1.1]	**Finding the Correct Site**	*Is this the correct site?*	**Identification**
	[A.T.1.2]	**Entering the Site via an Appropriate Threshold**	*Where should I enter onto the site?*	**Identification**
			How do I get to that site threshold from here?	**Navigation**
	[A.T.2]	**Crossing the Site: Getting to the Point of Entrance**		
	[A.T.2.1]	**Finding and Following an External Approach Route**	*Where am I compared to the entrance and how do I get there?*	**Navigation**
			Where am I in relation to where I want to be on this approach route?	**Orientation**
	[A.T.2.1.1]	Communicating with Multi-Use Approach Users	*Can I communicate with Multi-use Approach users to know what they are going to do?* *What are the 'Pedestrian Rules' that I should follow?*	**Instruction**
	[A.T.2.1.2]	Accessing a Path	*How do I get onto a pedestrian path?*	**Navigation**
	[A.T.2.2]	**Avoiding and Dealing with Approach Hazards**	*Are there any hazards on approach? Where are they? Are they temporary or permanent?*	**Warning**

Table 4.1: Charting Way-finding of Journey Stage: Approach

[A.T.1] Arrival and Threshold

Based on Participants' experiences of arriving at, and crossing onto the site where the desired building was located, [A.T.1] Arrival and Threshold was composed of two sub-tasks: [A.T.1.1] Finding the Correct Site*,* and [A.T.1.2] Entering the Site via an Appropriate Threshold.

[A.T.1.1] Finding the Correct Site

Adam explained that a conversation with the Receptionist was often the only way he could be sure that he had entered the correct building and therefore know if he had: 1. found, and 2. entered onto the correct site.

The Way-finder's Question: *Is this the correct site?* failed to be answered. This indicated a lack of identification communication [e.g. the building name, function etc.], positioned within the building curtilage [e.g. immediately available when the visitor first stepped on to the site and before they moved inside the building].

When encountering this weakness of site identification during the Way-finding Journey, Adam explained that making assumptions based on other cues of identity, such as the building user, was a tactic he used when seeking out a certain type of building type. He stated: *'I could tell it was an arty building, there were students outside and they looked arty'.*

[A.T.1.2] Entering onto the Site via an Appropriate Threshold

When comparing her experiences of arriving at a building by car as opposed to arriving as a pedestrian, Katie identified *'how you got to a building'* influenced initial experiences of entering onto a site. She explained that vehicles were given clear indication of where they should enter on to a site, however stressed that as a pedestrian this cue was often absent.

Figure 4.7 is a record of three things:

1. It provides a brief analysis of context specific site information which includes the location of the four possible thresholds onto the case study site [A, B, C and D].
2. It provides a record of the direction [blue and green arrow] from which each of the Participants arrived at the starting point [*X starting point*].
3. It provides a breakdown of the site thresholds used. Participants who used Threshold B [Alfie, Evie and Grace] and C [Katie, James, Adam and Ben] arrived from the West [green arrow]. Those who used D [Lily, Emma, Jack] arrived from the East [blue arrow].

Katie experienced this Way-finding Hot-spot of an absent cue, during the Way-finding Journey. This resulted in her relying and trusting a stranger. She stated: *'I relied on him to help me get to the front door from the pavement'.*

Katie became dependant on the stranger to assist her and Bruno [her guide-dog], to: 1. enter onto the site, 2. cross the site, and 3. reach the entrance of the building.

Way-finder's Questions: *Where should I enter onto the site?* and *How do I get to that site threshold from here?* failed to be answered. Therefore a form of identification communication to indicate, *this is the threshold you should enter by*, and navigational information to indicate, *this is how to get to the site threshold*, were established as a requirement.

A further interesting occurrence, as illustrated in figure 4.7 [and described, left] demonstrates that during the Way-finding Journey all Participants entered onto the site via the Threshold they walked past on the way to the starting point [indicated on figure 4.7 by a red x].

This finding reveals that in these early stages of the Way-finding Journey, Participants were each collecting and remembering information about their surroundings as they passed through them. This accords with Arthur and Passini's (1992) Information Processing Model of Way-finding and supports that, regardless of visual ability, people take part in surveying and assessing their surroundings during the task of way-finding.

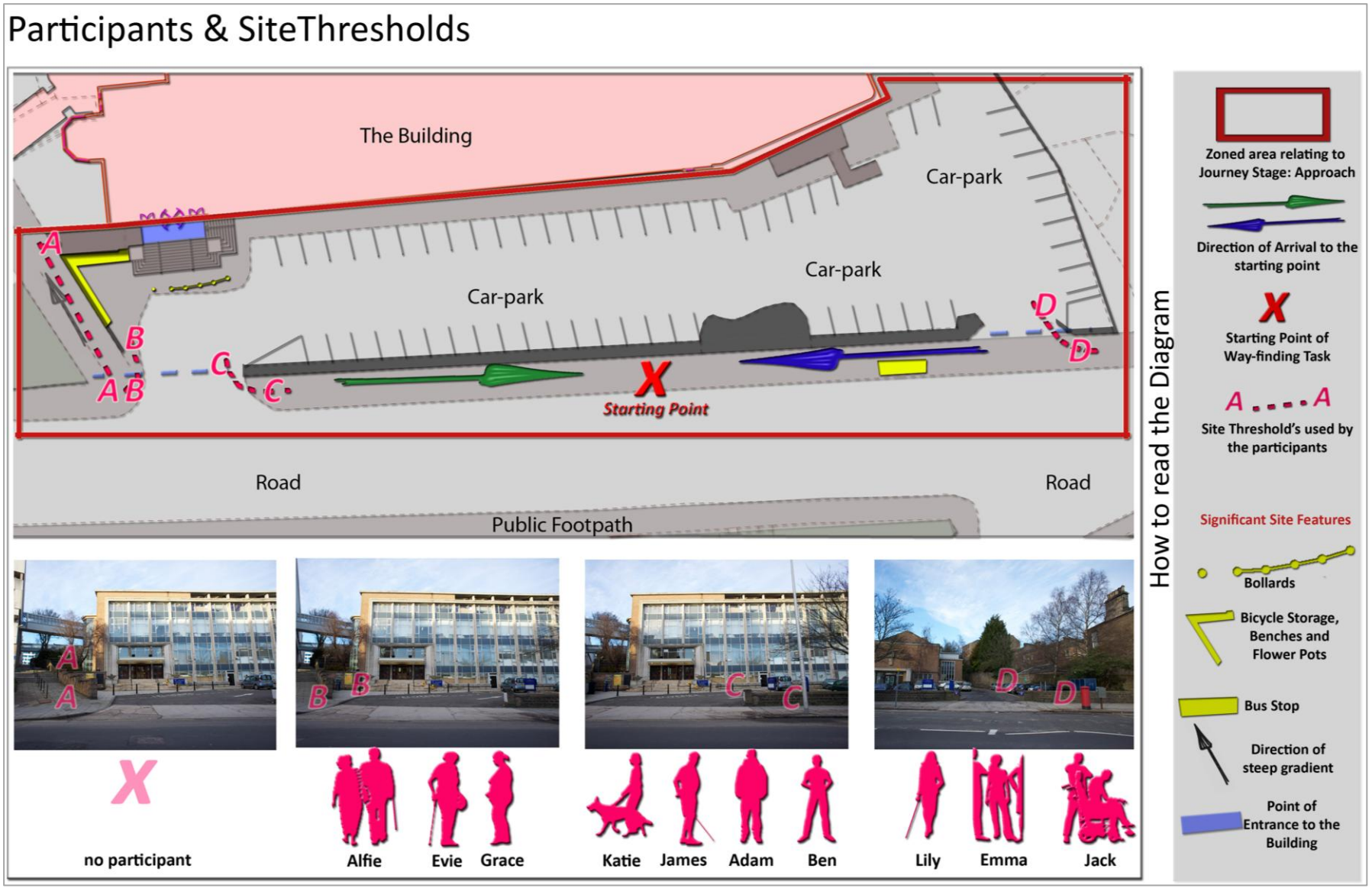


Figure 4.7: Participants & Site Thresholds Crossed

Figure 4.8: Alfie's Uncertainty in Movement

[A.T.2] Crossing the Site: Getting to the Point of Entrance

[A.T.2] Crossing the Site: Getting to the Point of Entrance had two sub-tasks: [A.T.2.1] Finding and following an External Approach Route *and* [A.T.2.2] Avoiding and Dealing with Approach Hazards.

[A.T.2.1] Finding and Following an External Approach Route

Katie, Alfie, James and Adam each expressed concern at not being able to find a pathway through a Multi-use Approach Route. They each struggled to differentiate between pedestrian pathways and vehicle areas.

Katie explained that because of the '*open space'* in front of a building, she struggled to *'figure out where all the edges'* of the site were. The bearing of *'no defined walkway from the public footpath to the entrance point*' resulted in a '*nightmare'* of having to move around *'parked cars and moving parking cars'*.

Katie recognised her strategy for dealing with these Way-finding Hot-spots involved her doing one of two things, either: 1. asking another person who is on the site for assistance, or 2. *'walking around the edge of the car-park to find the site boundary to then find the front door'*. As already identified in [A.T.1.2] Entering onto the Site via an Appropriate Threshold, Katie opted for the first strategy during the Way-finding Journey and a stranger guided her through the Multi-use Approach Route to the entrance.

Alfie also experienced a Way-finding Hot-spot when approaching the entrance to the building during the Way-finding Journey [figure 4.8]. He suddenly stopped and explained the reason why: *'I could hear an engine running but I didn't know where it was, it was close though. Was it a road? There were no differences to detect. No indication of where the pavement was'*.

This was when Alfie realised that he was walking along a Multi-Use Approach Route. Evidenced from the film footage, a delivery van was waiting in the drop-off point with its engine running. Alfie only began to walk again once the van had driven out of the car-park and the engine could no longer be heard. Although he was walking on a pedestrian pathway he explained that the sounds of the vehicle made him anxious.

James experienced a Way-finding Hot-spot when his *'orientation was knocked off for a second'* when he was not able to find or follow a route through the Approach. He explained: *'I was lost'.* In order to *'get on the right track again'* he employed a recognised tactic of using a shoreline (Nadel, 1999). He used his cane to re-trace his steps.

A more serious Way-finding Hotspot was encountered by James and Adam during their approach to the building. This was a result of 1. not realising that they were crossing a multi-use approach route and 2. not finding a pedestrian path. They both suddenly had to stop because a car interrupted the route they were walking along.

Adam explained: *'I panicked [...] I could suddenly hear the car coming beside me. Then I saw it and stopped. I didn't realise I was walking across a car-park. You just have to be careful.'*

Ben had a positive experience during the Way-finding Journey, which was the result of him deciding to not follow a path. He selected his route across the site based on a decision that it was a short-cut and explained: *'It was the shortest way to the steps. There was a path, but there were no cars so I went for it'.*

In this instance Ben used his visual ability to assess the situation and decided to not use the path because there was a quicker way for him to get to the entrance. This demonstrated that he evaluated his surroundings and concluded that the route he was about to take was a safe short-cut to the entrance.

The Way-finding Hot-spots experienced when [A.T.2.1] Finding and Following an External Approach Route highlighted a need for navigational communication which offered clear distinction between vehicle and pedestrian areas. Katie suggested that a tactile contrast would enable people who are blind to both find and follow a path and also provide reassurance that they are walking in the correct direction. She said that in this situation a *'defined walkway from the public footpath to the entrance point'* of a building would lead pedestrians *'right up to the front door'* and therefore mitigate issues of having to navigate through moving, parking and parked cars.

There were two requirements of [A.T.2.1.1] Finding and Following a Route through Approach. The *Finding* component was dependant on navigational cues analysed from Way-finder's Question: *Where am I compared to the entrance and how do I get there?* The *Following* component was dependant on a form of orientation cue analysed from Way-finder's Question: *Where am I in relation to where I want to be on this approach route?*

[A.T.2.1.1] Communicating with Multi-Use Approach Users [Driver vs. Pedestrian]

Participants raised problems they had experienced when trying to communicate with drivers when in a Multi-use Approach Route.

Within the context of the street environment the UK Highway Code (Department for Transport) outlines 'Rules for Pedestrians'. In relation to this communication problem, Rule 14 (Department for Transport) states that when encountering a car, a pedestrian should 'use the outside edges of the vehicles as if they were the kerb' and 'never cross the road in front of, or behind, any vehicle with its engine running, especially a large vehicle, as the driver may not be able to see you' (Department for Transport). However, Participants in this study outlined the challenges they faced when not being able to follow these rules.

Katie highlighted a lack of instructional communication and understanding between drivers of cars and pedestrians. She said *'*drivers *expect pedestrians to stay out of their way'*. She explained that she cannot *'sense the boundaries of a car park'* and so a certain amount of danger exists *'if people aren't looking out their front mirror or their back mirror*'. She added: *'a car park is quite a horrid experience for a blind person'* and as she is not able to have eye contact with the driver she explained, *'I can't see the driver to know if he sees me'.*

This Way-finding Hot-spot highlights a lack of understanding between the different users of a Multi-use Approach Route. Baker (1999) has found that road users in particular are not aware of the challenges faced by people with visual loss.

These experiences raised the question of how people with a visual loss should negotiate these situations. Instruction communication - an equivalent of 'Rules for [Sighted] Pedestrians' (Department for Transport) for people with various degrees of visual loss- was identified as lacking. The Way-finder's Questions: *Can I interact with Multi-use Approach Route users to know what they are going to do?* and *What are the 'Pedestrian Rules' that I should follow?* failed to be answered. This had a negative impact on Participants' experience and ability when using Multi-use Approach Routes.

[A.T.2.1.2] Accessing a Path

As an architectural component, Lynch (1960), Unwin (2000), Ching (1996) and Arthur and Passini (1992) each stress the significance of a *path.* Within Approach, the clarity of a path or route through approach to the entrance of the building was highlighted as an extremely important element by Participants in this study.

During the Way-finding Journey the ease with which Emma, Evie and Grace found, gained access, and followed a pathway [distinctive from the vehicle area] resulted in them having a

positive experience of Approach. Evie explained: *'it was quite handy, I just followed the path and got to the front – no problem'.*

Figure 4.9: Jack's Encounter with the Ramp

In contrast, Lily and Jack experienced negative Way-finding Hot-spots because they could not access a pathway. Lily walked through the middle of the car-parking area and described her frustrations explaining that cars which were *'parked all over the place'* prevented her from finding a point where she could access the pedestrian pathway.

Jack experienced the greatest amount of difficulty during the Way-finding Journey when trying to find and follow a pathway which would lead him to the entrance. On his approach [figure 4.9] he used a ramp which he assumed would grant him access to the footpath. Instead, it led him to a landing area and he explained that he became *'stuck at the top'*.

This resulted in wasted time and effort as he explained that the only way to get on to the pathway from the landing was to walk down two steps which he was not able to do because he used a wheelchair. From this landing he manoeuvred his wheelchair and came down the ramp again onto the car-parking area. He approached the entrance by coming through the car-parking area and made several attempts to gain access to the pathway through the parked cars. In attempting to do this, another Way-finding Hot-spot relating to his ability to judge distances was uncovered. When moving between two parked vehicles Jack became trapped and explained: *'when I see a lorry and a car parked together I usually think that I will be able to get through the gap in between - even though I can't.'*

From these experiences a lack of navigational communication was highlighted when the Way-finder's Question: *How do I get onto a pedestrian path?* failed to be answered.

[A.T.2.2] Avoiding and Dealing with Approach Hazards

In addition to the hazards outlined in regard to crossing a Multi-use Approach Route, the recognition and avoidance of external objects such as bins, street furniture, kerbs and bollards with chains were the cause of hazards experienced during Approach.

This study makes distinction between two types of obstacle: permanently placed objects [e.g. speed bumps] and temporary/changeable placed objects [e.g. plant pots].

Not only were these objects identified as causing Way-finding Hot-spots because they obstructed a pathway without warning, but Participants also identified that they were not able to know if a previously clear path had been interrupted by a temporary placed object. The experience of accidents, fear and stress were identified as the impacts of this type of Way-finding Hot-spot. Alfie said that he often found the route to a building to be an *'obstacle course of bins, gates and moving cars'* and experienced an accident when he fell over a speed bump used as a traffic calming intervention.

'I have noticed that a lot of the pavements have things spilling out onto them like wheelie bins and rubbish. It really worries me because Jack has to go out onto the road. Bin recesses would be a good idea. The path is suddenly for one person and not two people and Jack can't fit in his wheelchair so has to go onto the road. [...] they are usually really busy roads with all sorts of traffic that won't really notice him. [...] this is the only way that he can get around it. He can get really stressed!'

Figure 4.10: Dave's statement relating to Jack's Hazards

<u>Temporary or Changeable Placed Objects</u>

Katie highlighted problems she had experienced due to a *'fear of falling'* over things such as *'street furniture and pretty, but useless plant pots'*. She suggested that if such features were placed in designated areas which are *'to the side of open spaces, or slightly closed off',* then her *'fear of falling'* could be mitigated.

Lilly echoed Katie's concern, explaining she cannot see *'boundary edges'* therefore struggled to negotiate sporadically placed objects. She suggested that colour could assist her to define edges but highlighted that excessive colour was detrimental to her residual vision.

As illustrated in figure 4.10, Dave outlined the hazards and stressful situations which Jack encountered.

Permanently Placed Objects: Encountering Kerbs

Jack and Lily also identified that kerbs caused problems. Issues concerning the height of the kerb, not being able to see the kerb in the dark, or find a lower kerb were identified as the main issues.

Jack explained: *'I miss kerbs and can have accidents, especially in the dark when I have to look for lowered kerbs. I can't bump up kerbs in my wheelchair so have to look for lower ones.'*

Lily highlighted that she cannot always rely on her past experiences of a setting and that changes made from one visit to the next can result in previously gathered way-finding knowledge to be wrong. She described an example of this: *'I tripped up a kerb and broke my wrists. It was a kerb stone that had been redone when they had redone the road. I couldn't tell that they had made the kerbs higher. I really did fall quite spectacularly. I was mortified [...] You do that thing where you get up really quickly in a "nothing happened kind of way"'.*

In this case, her collision with a kerb caused her to have a severe accident and she demonstrated a particular issue where she could no longer rely on her previous experience of her surroundings. It indicates that when relying on previous knowledge of way-finding to support a current journey, new Way-finding Hot-spots occur when the surroundings change. Predictability is important for people with visual loss (Bernsen, 1996).

Figure 4.11: Bollards on the Approach Route

Permanently Placed Objects: Encountering Bollards

Baker (1999,p. 47) recommends that 'under no circumstances should adjacent bollards be linked with a chain or rope'. The importance of this guideline was highlighted during the Way-finding Journey when several of the Participants encountered Way-finding Hot-spots due to chain-linked bollards located in front of the building's main entrance [figure 4.11].

Alfie came across the bollard as his cane hit off the outside edge of one. He then spent time investigating the area by walking around using his cane to sweep the area. He expressed concern that his cane would not be able to detect the swinging chain and that this could potentially result in him having an accident by falling over it.

Adam experienced a minor accident as he collided with one of the bollards, while James narrowly missed a more severe accident by fortuitously walking through the only two bollards which did not have a chain connecting them. James was walking at a fast pace and it was clear from his way-finding trace that if he had changed his direction of travel, even slightly, that he would have collided with, and tripped over, the chain between the other bollards.

A lack of appropriate hazard warning communication within Approach was raised by Participants Way-finding Hot-spots as a requirement. The Way-finder's Questions: *Are there any hazards on approach? Where are they? Are they temporary or permanent?* failed to be answered.

There were two types of obstacle identified - temporary or permanent. Therefore, it can be concluded that warning communication should also infer the nature of the hazard. The Way-finder's Question becomes: *Is this hazard temporary or permanent?*

In agreement with Barker (1995) and Baker (1999) the participants experiences of Way-finding Hot-spots caused by bollards, present further reason to avoid the use of bollards and other low positioned obstacles within the Approach to a building.

4.2.2 Journey Stage
Entrance

Specific to the initial internal conditions encountered within a building, Journey Stage: Entrance encompassed Way-finding Hot-spots which occurred on the Way-finding Journey between entering the building [i.e. the act and actions taken to enter] and the immediate experience of welcome and reception.

Although Entrance Doors are discussed within this Journey Stage, analysis relating to Way-finding Hot-spots associated with general tasks of using doors is undertaken within Journey Stage: Non-Specific.

Using Table 4.2 as a summarised guide, the hierarchy of Task Components and Communication Requirements evidenced within Journey Stage: Entrance is now discussed.

Journey Stage		Task Component [Way-finding Hot-spot]	Communication Requirement [Way-finders Question and Communication Need]	
Entrance				
	[E.T.1]	**Entering and Welcome**		
	[E.T.1.1]	**Using an Appropriate Entrance Threshold**	*How do I get into the building?* *Is this the right type of door for me to use?* *How do I use this door?*	**Identification** **Navigation** **Instruction**
	[E.T.1.1.1]	Using Types of Entrance Doors		
	[E.T.1.1.1.1]	*Double Sets of Doors*		
	[E.T.1.1.1.2]	*Automatic Sliding Doors*		
	[E.T.1.1.1.3]	*Glass Door*		
	[E.T.1.1.1.4]	*Revolving Doors*	*Is there an alternative door?*	
	[E.T.1.1.1.4.1]	*Using /Being Allowed to use an Alternative Door*	*How do I get to the alternative door?*	**Navigation**
			Am I allowed to use this alternative door?	**Identification**
	[E.T.1.2]	**Being Welcomed**	*Is this the correct building?*	**Identification**
			Am I allowed to be here and am I welcome?	**Identification**

Table 4.2: Charting of a Way-finding Journey: Entrance/01

Journey Stage		Way-finding Task Component [Way-finding Hot-spot]	Communication Requirement [Way-finders Question and Communication Need]	
Entrance				
	[E.T.2]	**Forming a Strategy to get Around the Building**		
	[E.T.2.1]	**Using a First Form of Directional Information**	*How will I get to the Destination?*	
	[E.T.2.1.1]	Using Entrance Staff	*Can I find a member of Entrance Staff?*	**Identification**
			Can I understand directions given out by Entrance Staff?	**Instruction**
	[E.T.2.1.2]	Using Entrance Signage	*Can I find Entrance Signage?*	**Identification**
			Can I understand and use Entrance Signage?	**Instruction**
	[E.T.2.1.3]	Pre-prepared Information	*Can I access Way-finding Journey information before I go to the building?*	**Instruction** **Navigation** **Orientation** **Warning** **Identification**

Table 4.2: Charting of a Way-finding Journey: Entrance/02

[E.T.1] Entering and Welcome

[E.T.1] Entering and Welcome was composed of two sub-tasks: [E.T.1.1] Using an appropriate Point of Entry, and [E.T.1.2] Being Welcomed.

[E.T.1.1] Using an Appropriate Point of Entry

'People first have to find the door' (Arthur and Passini, 1992,p. 117).

Finding the entrance door is aided by a clear, decipherable, legible entrance (Arthur and Passini, 1992;Ching, 1996). It is not only important that the approach to the entrance is communicated but also that the door itself is recognisable.

These features of identification communications failed Jack and Dave during the Way-finding Journey. Jack was not able to independently find an entrance door. He could not use the external steps to get to what he called the '*regular entrance'* and stated, *'I had no clue how to get in'.* Together Jack and Dave developed a strategy to overcome this Way-finding Hot-spot. While Jack stayed outside, Dave used the steps and went into the building.

Once inside the building, Dave sought assistance from the building staff and explained the process he went through to find an alternative way for Jack to enter the building.

'I went into ask the Receptionist how to get in and what to do. I spoke to the Security Guard who took me up some steps, past a reception desk and into a long corridor. He then took me up a ramped area to fire doors which lead outside to the path where Jack was waiting. The Security Guard opened the door and Jack came in [...].'

Jack and Dave entered via a fire escape door which opened outwards onto a path. Jack described a Way-finding Hot-spot regarding this entrance: *'That entrance wasn't very clearly*

marked for me to be able to get in. There were no push buttons or handles [...] and it could only be opened from the inside'.

Dave was outraged at this situation and explained: *'If it had been raining, Jack would have been sitting outside in the rain while I went to fetch someone.'* He also identified another problem: *'If he* [Jack] *had been there by himself [...] He would have had to rely on someone passing by and helping him. He could have been sitting there for ages.'*

Although Jack eventually got into the case study building, Barker et al.(1995) warn against this type of secondary entrance. They state that alternative routes to an entrance [via steps or ramp] should be 'perceived to be of equal importance' (Barker et al., 1995,p. 60)

Jack's experience highlighted a lack of identification communication which indicated an alternative entrance point. Way-finder's Question: *How do I get into the building?* failed to be answered without help from the Receptionist.

[E.T.1.1.1] Using Types of Entrance Door

[E.T.1.1.1] Using Types of Entrance Doors [i.e. double sets of doors, revolving doors, automatic doors and glass doors] caused distinct problems, and was thus flagged by Way-finding Hot-spots. There were two main Way-finder's Questions evidenced due to: 1. an identification requirement*: Is this the right type of door for me to use?* and 2. an instruction requirement: *How do I use this door?*

[E.T.1.1.1.1] Double Sets of Doors

James and Evie described frustrations due to the uncertainty caused by double sets of doors which swing in two directions.

James explained: *'you go in one door and another opens out towards you. You are in-between two sets of doors and they are swinging backwards and forwards. I get trapped and panic'.*

Evie stated: *'To enter you sometimes walk through a door where you then have another door that is opening out onto you. The first one is swinging away from you. It's a problem because no matter which direction you are going, you don't know how it is going to open'.*

In addition to experiences of frustration and panic, Emma spoke of being *'bashed'* when walking though an automatic set of swinging doors. She explained this was the result of not knowing that the door had been previously activated and was swinging uncontrollably.

To mitigate these issues, Barker et al. (1995) suggest that although the environmental control of the entrance space would be jeopardised, problems posed by double doors could be overcome if they were to open together, at the same time, in the same direction. Unfortunately, in solving one problem, this solution would create another and if put into practice, the conditions of the entrance space could potentially become environmentally unpleasant and unstable [i.e. a lack of control of the weather elements] for staff and visitors.

Based on Way-finder's Question: *How do I use this Door?* it was demonstrated that a form of instruction communication to indicate 1. how the doors were going to open and 2. where the way-finder should stand in relation to the door, was lacking. This instruction communication could mitigate the issue of uncertainty by keeping the way-finder informed of what they should do when faced with using a double set of doors.

[E.T.1.1.1.2] Automatic Sliding Doors

Automatic sliding doors have been championed as providing the easiest method for people to negotiate entry into a building (Barker et al., 1995). Evie and Lily however, recounted experiences which contest this. Evie explained, *'I have reached the door but can't feel a door*

handle or figure out how the door opens. I then think, "Oh it must open itself" and I must have walked too quickly and missed the sensor. Then someone is usually behind me saying "you must step back or it is going to hit you".' Lily added: *'I catch myself in front of them and they are shut. I can't see them so I walk straight into them.'*

Indication of where to stand to activate the sensor, and advanced warning to *'slow down sensor-operated door ahead'* were raised as being the forms of instruction communication which were deficient.

[E.T.1.1.1.3] Glass Doors

Lily, Evie and Katie each identified that if an entrance door is glazed without a distinguishable indicator then problems in being able to recognise it as a closed door can occur.

Lily explained, '*Glass doors are awful. My depth perception is off so I can't tell if it is close or far away. I can't see them. There are times when I horrify the staff by walking into them'.*

Evie echoed Lily's concern: *'Glass doors are a massive problem because I can't see them.'* She described having an accident when she walked into a glass door because she could see *'the outside'* and so thought it was open. Explaining that it was *'horrific'* she identified that although not being physically hurt, she '*went into a state of complete shock'.*

Katie spoke generally about the lack of defining a glass door and made a recommendation: *'A band of colour could maybe help prevent a person with visual impairment from banging straight into a glass door'*.

From these experiences it is highlighted that identification communication to indicate a glass door was missing.

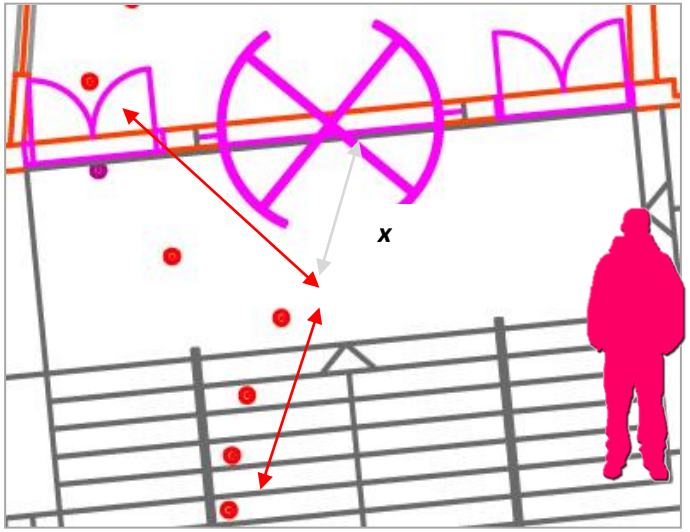


Figure 4.12: Adam's Strategy - Avoiding the Revolving Door

[E.T.1.1.1.4] Revolving Doors

'The revolving door is a difficult door for all – particularly [...] *for* people with a visual impairment' (Barker et al., 1995,p. 57).

In this study the Way-finding Hot-spots of using revolving doors confirmed the above statement. Adam elaborated: *'I hate revolving doors; I have got my hand stuck in one before. I cannot see the best place to put my hand or which way to push. I can't see if someone else is coming out and if they are pushing the door that makes me nervous. I normally try to avoid revolving doors'.*

Adam puts this strategy of avoiding revolving doors into practice. Figure 4.12 demonstrates that he made a conscious decision to avoid the revolving door when he altered his direction to and walked through the door positioned to the side of the revolving door.

James also experienced an accident caused by revolving doors, he explained, *'Revolving Doors are hazards for a person who can't see. They are a real problem, if that is the only way of getting into the building. Where do you push?'* As a strategy he said that he always tries to avoid using them due to having an accident when his hand was trapped by the door.

James experienced a Way-finding Hot-spot due to a revolving door [figure 4.13], he explained: *'I went straight to the door that was accessible and it was half open so was swinging both ways and I got stuck'.*

Instruction communication relating to how to use the revolving door [i.e. Indication of where to enter and how to operate the door] was highlighted as absent. Additionally, communication to enable Participants choice to: 1. identify and use an alternative door and; 2. navigate to it, were highlighted as the communication requirements.

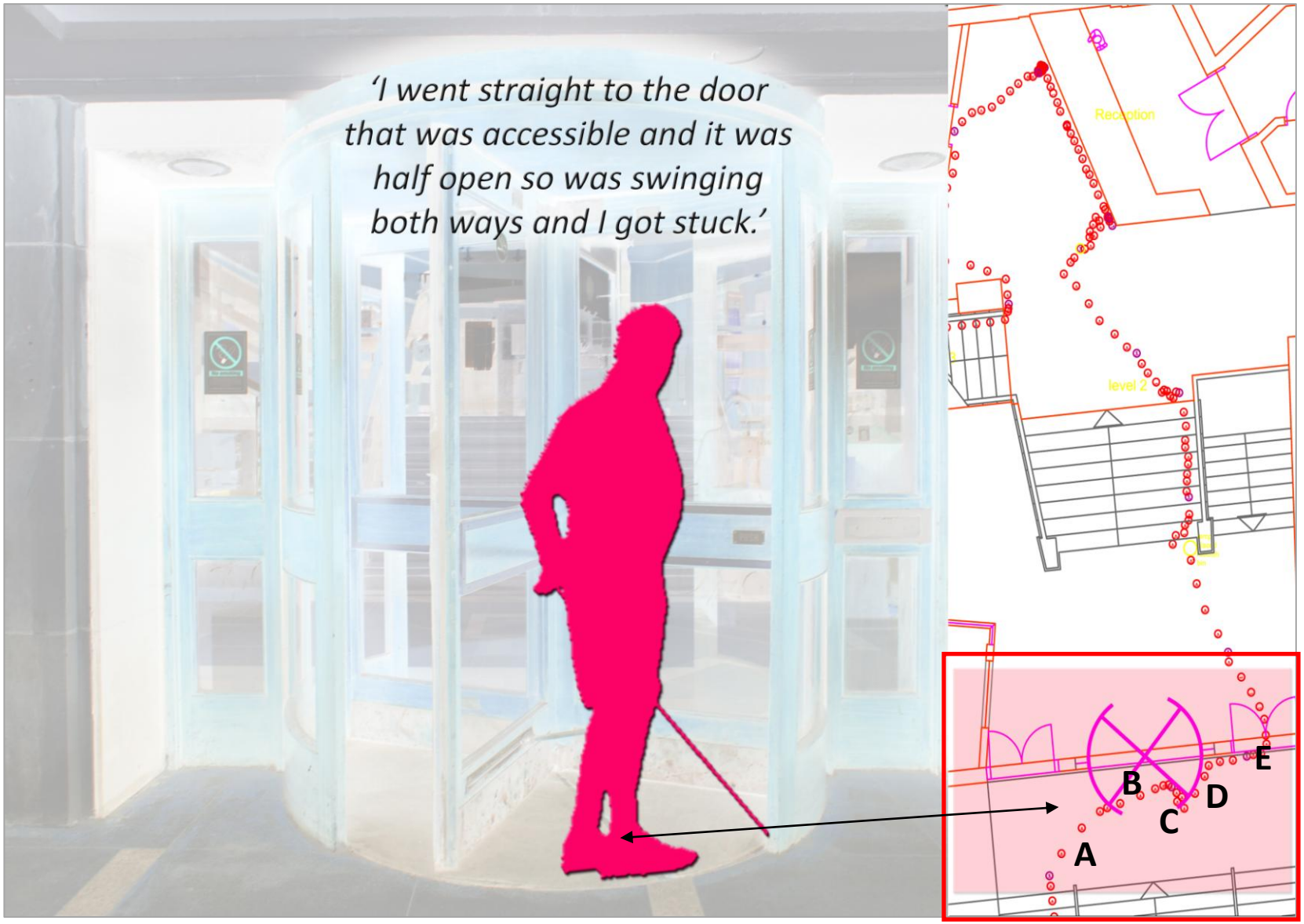


Figure 4.13: James' Encounter with the Revolving Door. James walks from the stairs to the middle of the building façade [A]. He *crashes* into one of the divides of the revolving door which results in him becoming *stuck* [B]. Using his cane he tries to move out onto the landing again but because of how the revolving door is positioned he *crashes* into another of the doors[C]. He then walks around it using his cane and follows the edge of the building [D] where he finds another door and enters the building [E].

[E.T.1.1.1.4.1] Using /Being Allowed to use an Alternative Door

A sub-task of [E.T.1.1.1.4] Revolving Doors - [E.T.1.1.1.4.1] Using /Being Allowed to use an Alternative Door was highlighted by Way-finding Hot-spots. The finding and using of a *'normal door'* [experienced by James and Evie], and being granted permission by building staff to use it [experienced by Emma], caused challenges.

Evie explained: *'There is sometimes a normal door but I can't see it so can't find it.'*

Emma stated: *'We got stopped by the Security Guard who shouted "this is a disabled door". I had to reply with "I can't see". He said, "Oh, Ok then I suppose that's alright." In the end he let me through but he made my friends use the revolving door.'*

Identification of the alternative door and navigation communication required to locate it were raised as the communication requirements of Way-finder's Questions: *Is there an alternative door? Where is the alternative door? Am I allowed to use it?*

Emma's experience raised awareness as to how important staff etiquette and training is in relation to dealing with this type of situation.

Summary: *[E.T.1.1] Using an Appropriate Entrance Threshold*

Way-finder's questions asked within [E.T.1.1] Using an Appropriate Entrance Threshold: *How do I get into the building? Is this the right type of door for me to use? How do I use this Door? Is there an alternative type of door? Where is the alternative door? Am I allowed to use it?* were the result of missing forms of identification, navigation and instruction communication.

[E.T.1.2] Being Welcomed

'I'd say that the entrance is the most important thing in a building that is new to someone. Once I have got inside, this is where I figure out where to go next' [Adam].

Adam's quote highlights the importance of the Entrance in relation to experience of [E.T.1.2] Being Welcomed into the building. The two principle questions raised by Participants in relation to this Task Component were: *Is this the correct building? Am I allowed to be here and am I welcome?*

As acknowledged in [A.T.1.1] Finding the Correct Site, the Way-finder's Question - *Is this the correct building?* - failed to be answered within the immediate surroundings of Journey Stage: Approach or Journey Stage: Entrance.

Adam relied upon asking the building's Receptionist to confirm that he had indeed entered the correct building. *'It's hard to work out where you have to go next'* he explained. '*The building entrance is always where I feel most embarrassed and frustrated. It is the place where I feel really impaired and annoyed. I sometimes feel that I can't come to a new building without relying on someone else for help.'*

He identified that if he is not able to familiarise himself with a new building within the *'first couple of steps',* then this makes him want to leave and effects probability of future visits. This highlights the nature of frustrations encountered by Participants when in the Entrance stage of a building.

Grace explained that she feels she *'stick*[s] *out like a sore thumb'* in the entrance of a new building and described the experience as *'quite frustrating'*. When visiting a new building for the first time, she identified that *'feeling really out of place and anxious about being there'* was because she is a visitor and knows she doesn't *'belong, work or live there'.*

In Jack's Way-finding Journey he had to use an alternative entrance to get into the case study building. This had significant impact on his experience of welcome because he did not immediately arrive within the main entrance/reception area of the building. Jack and Dave described the resultant sequence of events they experienced because of their alternative entrance point: *'The door took me into a long narrow ramped corridor. I would have had no chance if I was carrying something as part of a meeting. I wouldn't have been able to get in without the help from someone else to carry it. When we got to the end* [of the corridor] *there was no signage [...] no Receptionist or anything.'*

In pre-empting that they would need directions from the Receptionist, Dave explained: *'I always have to think on my feet a bit. When I came in to try and find a way for Jack to get in, I quickly asked for directions from reception. I explained where we needed to go and she gave me directions. So I just guided Jack and tried to remember the directions to get there. There is nothing to point to the reception from where Jack arrived. He had to rely on what I knew.'*

These Participant statements highlight the importance of welcoming and forms of identification communication to enable Participants to establish if they: 1. had entered into the correct building and 2. were welcome and allowed to be there.

[E.T.2] Forming a Strategy to Get Around the Building

In establishing that the Entrance was the point in the Way-finding Journey where the plan to get to the destination was formulated, Participants identified the methods used when [E.T.2] Forming a Strategy to Get Around the Building.

Adam explained that he would use *'a map or floor plan, or a Security Guard or Receptionist'* and highlighted that he could only trust directional information *'which came from something*

or someone who belonged to the building'. He followed this by explaining *'getting wrong directions in the entrance is worse than getting no directions at all'.*

Emma stated: '*if it's an unfamiliar building I tend to panic slightly'*. She outlined three strategies to deal with this *'panic'*: 1. seeking signage and assess whether or not she can read it, 2. seeking someone else to ask but stated that she would always ask for directions from a Receptionist, or 3. asking herself, *'Am I feeling brave enough to go and find it myself?'*

Alfie stated that he was always accompanied by someone and that he and his companion would go together to the Receptionist to ask for directions in an unfamiliar setting. Likewise, James, Grace, Katie and Evie all said that they would ask for directions at the Reception desk.

As illustrated in figure 4.14, Ben explained his strategy: *'When I first come in I just have a nosey about. Normally, if it's not obvious where I should go, the first thing I do is look for a reception or sign-posting.'*

[E.T.2.1] Using a First Form of Directional Information

Participant's each described the strengths and weaknesses of [E.T.2.1] Using a First Form of Directional Information as they formulated the answer to the Way-finder's Question: *How will I get to the Destination?*

The sub-tasks of: [E.T.2.1.1] Using Entrance Staff and [E.T.2.1.1] Using Entrance Signage were experienced throughout the Way-finding Journey. It was also highlighted that if made available, [E.T.2.1.3] Using Pre-prepared Information would have helped Participants to independently plan their Way-finding Journey.

[The strengths and weaknesses of forms of directional information, i.e. Using Visual Signage, Using Tactile Cues and Relying on Others, are discussed within Journey Stage: Non-Specific.]

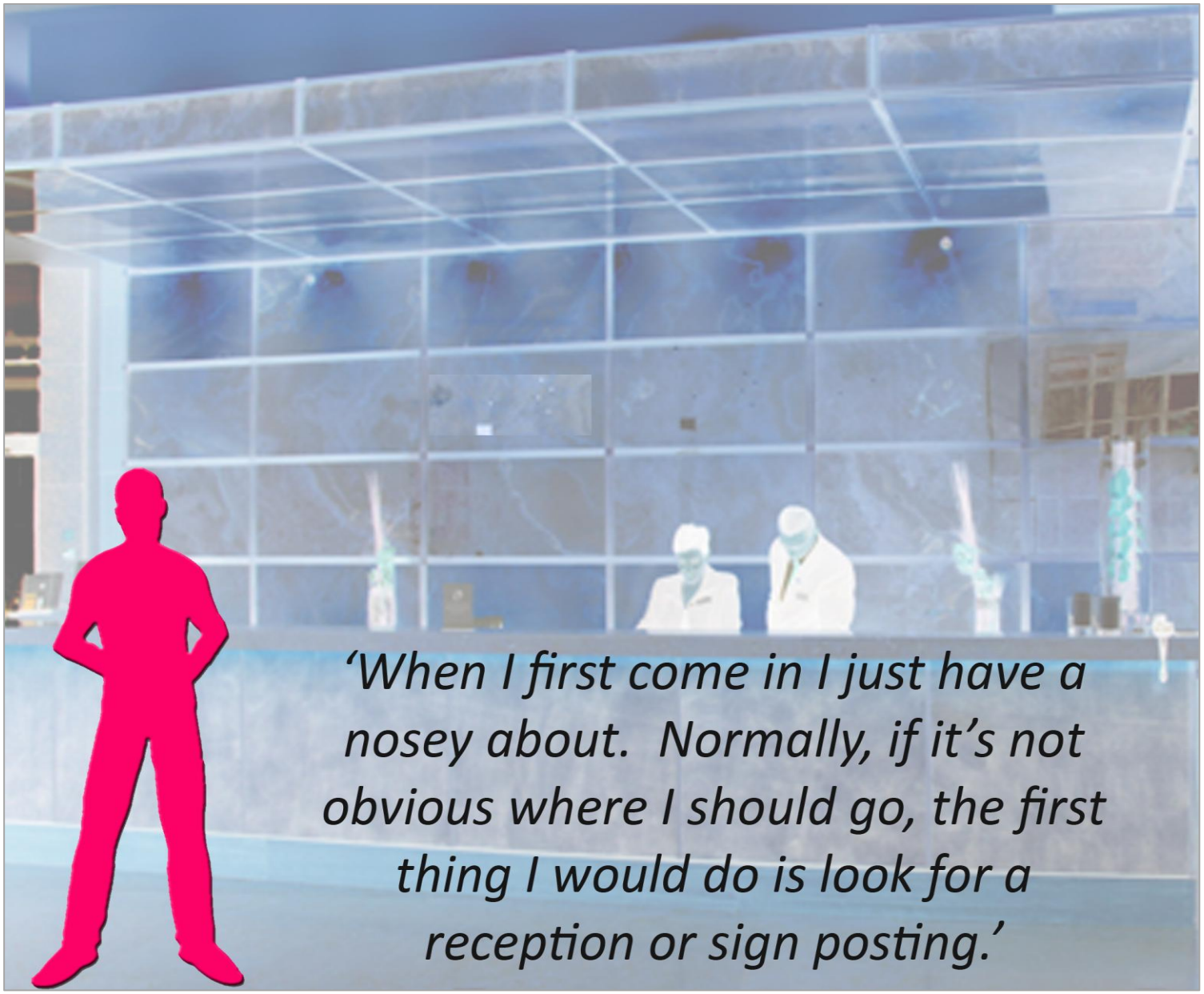


Figure 4.14: Ben's Strategy at the Entrance

[E.T.2.1.1] Using Entrance Staff

Evie defined entrance staff as *'the people who work in the building and are there when you first come in'.* Lily's statement *'They are the people at the front of house'* supported this definition. The Receptionist and the Security Guard were the entrance staff in this study.

James, Adam and Lily identified problems they had when trying to find the Receptionist. James explained, '*it's not because she isn't there. It's just 'cause I can't see or hear her'.*

James experienced this problem during the Way-finding Journey. He found the reception desk but because the Receptionist did not greet him, he found it difficult to find where she was in relation to where he was standing. He explained: *'It took me a while to figure out where she was standing and she didn't even say hello or anything...like she was ignoring me. When she did say "Hello" I walked towards her voice.'*

Adam also experienced difficulty when trying to find the reception desk and explained: *'The Security Guard came to see if I needed help and pointed me in the direction of the reception office. This was the most embarrassing part of the whole trip 'cause it must have looked like I was lost. I was walking close to the wall to see if I could see any signs...that was when he shouted "are you ok?" [...]I nearly walked into a wall. The reception was just behind me.'*

During Lily, Ben and Adam's Way-finding Journey's, the reception desk was unmanned. This presented them with further difficulties. Adam stated: '*There was no front desk, no-one in the position of "I'm the one to talk to".'*

Ben explained how the unmanned reception had a negative impact on the rest of his journey around the building: *'There was no one on reception. So I couldn't get any directions and that affected how I was going to do it all. I bet if someone had been there I wouldn't have ended up walking around the whole building.'*

Lily described the series of events which occurred due to: 1. the Reception desk being unmanned, and 2. a lack of sufficient communication being available to her at the Entrance:

'I managed to walk in, right up to reception, but there was nobody there. But there is a sign and it says, "If there is nobody here then go to the office." I am just thinking "and where would that be?" I seen an office and I knew it was the janitors office, but there was no janitor there...so I am just standing there and I am like "right what do I do now?"

'Then a guy comes out and says "oh can I help you?" - and I just say to him – "oh I am looking for the reception office", and he said, "it's just there", like it was really obvious and I was being silly.'

She continued: *'There is a sign above the door on chrome with black writing. Apparently it must have said reception office, but there was no way that I would have seen it.'*

When reflecting on this Way-finding Hot-spot she stated: *'It's not very helpful - why don't they have someone on reception - on a public relations front - there was no one there to welcome people, or give directions.'*

Adam also experienced a lack of welcome from the Receptionist and stated: *'I was stood outside reception and the door behind reception was open but no one came out. [...] actually that is quite bad management, cause if someone sees you standing at a reception desk and there is no Receptionist - if she is on lunch or having a toilet break or whatever - there should be a bell or something that you could press to get the attention of other members of staff who could help.'*

Staff Etiquette was raised as an important factor with regard to welcome to a building. Participants' experiences of interacting with welcoming staff varied and this impacted on their ability and experiences during the Way finding Journey.

In Evie's case, she found the Security Guard: *'I saw some people, so I went over and he* [Security Guard] *appeared from a door. I asked him for directions...he tried but then offered to take me... and I just thought "yes, well why not." He sounded handsome you see. So he just took me to the Destination. As soon as he took my arm I just switched off and didn't pay attention. That was a pretty bad thing to do though 'cause I wouldn't have been able to get back out again. I stopped paying attention and just trusted him.'*

James identified: *'good staff on reception can help but when I ask for directions they give really visual directions which I can't use'*. He explained that it would be helpful if Receptionists were trained in giving non-visual directions: *'It would be great if they talked about floor surfaces or smells, or even sounds and things like that.'*

During the Way-finding Journey James explained that the Receptionist *'seemed to freak out and had to think on her feet'*. When he asked for directions he said that they *'were really quite hopeless'* as he was not sure where they would lead him.

Lily also experienced confusion when trying to get directions from the reception office that she could use: *'you would think they would be good at giving directions...they were awful. They couldn't decide on how many doors or whether it was left or right. It was quite difficult because I had to try to remember a complicated set of instructions [...] I had to concentrate really hard. Then they started to disagree...They are going "ok...is the left...is it, no...oh hang on - oh no, [...]and they keep talking like that [...]and then someone said, "oh, you might just have to ask someone when you have gotten that far along".'*

Adam described his *'awkward'* and *'awful'* experience of asking the Receptionist for directions: *'I go in* [to the temporary reception] *and start asking for directions. The*

Receptionist came over to me and she spoke at the whole room of other people said "oh I don't know. Do any of you know where he wants to go?"'

He continued: *'The more she* [the Receptionist] *asked, the less I wanted to say. I felt really frustrated! I just gave up on her and by the end of the conversation I just said that I would just go and find it myself. She was quite annoying and didn't give me time to speak. She wasn't really listening to me. I hated this part of the journey. I just said that I would go and look myself and just walked out.'*

After this encounter with the Receptionist, Adam left the office and explained: '*The next part was a detour. I wanted to get away from the Receptionist as fast as I could'.*

Collectively these experiences of [E.T.2.1.1] Using Entrance Staff highlighted the important role of *'front of house staff'* [Lily] as a first form of directional information. These experiences have identified the potential embarrassment, frustrations and confusion that can be caused when etiquette of entrance staff with regards to welcoming is sub-standard or non-existent. Adam explained, '*a patient Receptionist who listened to me was all I needed'.*

These experiences have also highlighted the importance of the positioning of the Reception Desk within the welcome to the building. Identification communications to enable Participants to find the reception desk could have aided to answer Way-finders Question: *Can I find a member of entrance staff?* James suggested that forms of non-visual instruction communication would help answer Way-finder's Question: *Can I understand directions given out by Entrance Staff?*

[E.T.2.1.2] Using Entrance Signage

Adam highlighted that whilst he *'didn't directly look for reception'*, he had to because there was no entrance signage to help him way-find to the destination. He stated that navigation

and orientation communication such as '*"this is a room" and "this is a corridor" and "if you are looking for this you go along the corridor"'* would have been of great benefit to him.

Lily also spoke of a lack of '*welcoming entrance signage'* and stated: *'There's nothing when you come in to show you where anything is or where to go. Nothing to say "1st floor is this", "Second Floor is this" [...] I was trying really hard to pay attention.'*

Grace highlighted how important positioning of signage was to her in the Entrance of a building: *'It has to be right at the front of a building so I don't waste my time running about a building looking for a room. I tend to look for signs in the entrance [...] so I can begin to narrow down my search.'*

She added: '*In this building* [case study building] *it was awful. I didn't notice any signage that would have helped me [...]. Immediately I didn't know what to do.'*

Ben recognised that whilst there were signs in the Entrance [and throughout the Way-finding Journey], they were often obscure and he was unable to use them. He added: *'It was difficult 'cause all the signs were covered up by other signs which were advertising an open day. I tried to lift one at the start but they were fastened on. I didn't want to get into trouble.'*

These experiences indicated how important entrance signage is to someone who, without help from entrance staff, wants to independently plan their Way-finding Journey. Way-finders first have to be able to identify that there is signage which they can use. Way-finder's Questions: *Can I find Entrance Signage?* along with, *Can I understand and use Entrance Signage?* were the result of missing forms of identification and instruction communication.

[E.T.2.1.3] Using Pre-prepared Information

Gaining knowledge of a building prior to arrival was raised by Participants as a way for them to independently plan and prepare for a Way-finding Journey around an unfamiliar building.

Grace explained that she liked to know *'exactly'* how to get to where she is going. She said *'I would try before hand, to get room numbers and things like that...the details I need. I would make sure that I had their* [the person she was meeting] *mobile number. Or if I thought it would be difficult to find them I would get them to meet me at the front door. But these would all be things that I would arrange before I arrive. [...] those would be my strategies.'*

Katie stated: *'It would be great if I could go online and get an idea of where the things like lifts and stuff are in a building. This would save me time. You know, for about ten years I couldn't find the lift in my local train station, then one day a kind gentleman showed me. I would have never known unless he had told me.'*

She added: *'A blind person will not know that things are there unless someone either tells them or actually physically takes them there and shows them the way. If I don't know it's there it doesn't exist as far as I'm concerned.'*

These statements highlighted that if way-finding information was available, previous to arriving at a building, it would enable Participants to independently plan and prepare their Way-finding Journeys. They would be afforded the option to become familiar with the unfamiliar and seek orientation, navigation, identification, warning and instruction forms of communication before they arrived.

4.2.3 Journey Stage

En-Route Destination

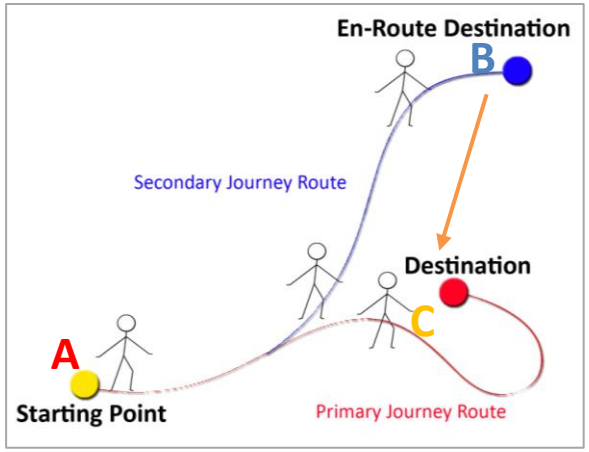


Figure 4.15: En-Route Destination Diagram

Within each Way-finding Journey, and secondary to the main Destination, Journey Stage: En-Route Destination was incorporated by Participants within their Way-finding Journeys.

As illustrated in figure 4.15, Journey Stage: En-Route Destinations encompassed Way finding Hot-spots which occurred whilst Participants undertook a part of the journey specific to leaving the Primary Journey Route [A], reaching the En-Route Destination [B] and then following a route to get to the Destination [C].

Using Table 4.3 as a summarised guide, the hierarchy of Task Components and Communication Requirements evidenced within Journey Stage: En-Route Destinations is now discussed.

Journey Stage		Way-finding Task Component [Way-finding Hot-spot]	Communication Requirement [Way-finders Question and Communication Need]	
En-Route Destinations				
	En.D.T.1	**Breaking the Journey**		
	En.D.T.1.1	**Making Discoveries and Having a Rest**	*If I break the journey how can I get back on the original route again?*	**Navigation**
				Orientation
	En.D.T.1.2	**Using the Toilets**		
	En.D.T.1.2.1	Finding the Toilets	*Where are the toilets?*	**Identification**
			How do I get to the toilets?	**Navigation**
	En.D.T.1.2.1.1	*Finding the Disabled Toilet*	*How do I get to the Disabled Toilet?*	**Navigation**
	En.D.T.1.2.2	Distinguishing between Male and Female Toilets	*Is the Male/Female Toilet?*	**Identification**
	En.D.T.1.2.3	Using the Bathroom/Toilet/ Fixtures and Fittings	*What do I do to use the fixtures & fittings in the Bathroom?*	**Instruction**
	En.D.T.1.3	**Exiting the building in an Emergency : Knowing what to do**	*What do I do in an Emergency?*	**Instruction**

Table 4.3: Charting of a Way-finding Journey: En-Route Destination

[En.D.T.1] Breaking the Journey

[En.D.T.1] Breaking the Journey involved Participants pausing, stopping or re-directing a Way-finding Journey. This was carried out in three ways: [En.D.T.1.1] Making Discoveries and Having a Rest; [En.D.T.1.2] Using the Toilets and; [En.D.T.1.3] Knowing What to do in the Case of an Emergency.

Way-finding ability in specific relation to incorporating En-Route Destinations was found to vary between Participants. It was subject to each Participant's confidence in deviating from the primary journey, reaching the En-Route Destination, and then successfully returning to the original Way-finding Journey.

Communications to answer Way-finders Questions: *If I break the journey how can I get back on the original route again?* were not answered. A full circle sequence of communications: 1] Orientation [i.e. *You are here and your en-route destination is there*, 2] Navigation [i.e. *This is how you get to the en-route destination from here*], 3] Orientation [i.e. *You are here - at the en-route destination, and the original destination route is there*], and 4] Navigation [i.e. *This is how you get back on the route to the destination*] were requirements vital to enable Participants to take part in [En.D.T.1] Breaking the Journey.

[En.D.T.1.1] Making Discoveries and Having a Rest

During the Way-finding Journey, several Participants encountered Way-finding Hot-spots caused by them making discoveries. Although these experiences were positive, they were also highlighted as sometimes being the cause of more negative Way-finding Hot-spots.

Ben acknowledged that because his Way-finding Journey did not take him directly from the start to the destination, he *'got a chance to see a lot more of the art and the various exhibits'*.

He stressed that although making these discoveries was an *'exciting, unexpected'* event, the time wasted in being distracted would have annoyed him if he was supposed to be meeting someone at a specific time.

Grace explained that making discoveries associated with thoughts of '*"oh I wonder what is up here"*' is a serendipity element of a *Way-finding Journey* that she enjoys. '*I like finding things in a building if I'm just walking around aimlessly and don't have to be anywhere in particular.'*

In these experiences, Ben and Grace implied that they take part in different types of way-finding and that the communications they needed reflected on what they wanted to achieve. They defined that a more relaxed way-finding or *The Wandering Way-finding Journey* would require less directing communication than *On a Mission Way-finding Journey,* when time was a factor.

Jack highlighted that, when stationary, his wheelchair can prevent people from moving past him. Therefore he felt under constant pressure to keep moving and so pausing to make discoveries wasn't always an option: *'I like having a look at what is happening. There are posters and signage everywhere. I am always quite interested in what they say, so I have a wee look and a nosey to see what's on, or what's being sold but because of the wheelchair I block areas and other people can't get past me. People get pretty annoyed sometimes.'*

In addition to not always being able to take part in making discoveries Jack identified the option to rest was not always available to him. He explained: *'There is nowhere for me to stop and pause or rest for a while and 'cause I take up so much room I am always aware of getting in the way. [...]We usually need to go straight from "A to B".'*

The opportunity to pause, rest and recompose was a highlighted by many of the Participants as an important part of the Way-finding Journey. Adam explained that he paused several

times to *'have a break'* and '*calm down'* during moments in the Way-finding Journey when he got stressed: *'I just stopped for a wee bit in a place where I could feel the sun on my face. I was feeling a bit sweaty and stressed. I just took a minute to calm down.'*

Adam, Grace, Ben and Emma all paused several times throughout their Way-finding Journeys to rest when looking through windows and over balconies. James also mentioned that he paused because of pleasant smells: *'I love all the different smells in a new building and I can always sniff out a good cup of coffee and cake'* he said, '*These are the wee delights I find when I am out and about'.*

James, Katie and Alfie all emphasised that if possible, they would prefer to not veer off the route to the Destination in case they got lost. Alfie stated *'I just concentrate on getting from A to B, I can't think of anything else'.*

[En.D.T.1.2] Using Toilets

Prior studies (Bichard et al., 2007;Bichard et al., 2008) have stressed the importance of enabling people, regardless of age, sex, ability or disability/impairment, to use a toilet within a public setting.

Findings from the Way-finding Scenarios compliment previous findings and demonstrated that the task of going to the toilet was, in itself, a mini Way-finding Journey. Four sub-tasks: [En.D.T.1.2.1] Finding the Toilets, [En.D.T.1.2.2] Distinguishing between the Male and Female Toilets, and [En.D.T.2.3] Understanding the Bathroom/Toilet Layout, were derived from Way-Finding Hotspots which emerged in specific relation to incorporating the En-Route Destination - Toilets into the Way-finding Journey.

[En.D.T.1.2.1] Finding the Toilets

When trying to find the toilets in an unfamiliar public building the reliance on someone else to either guide, or give directions to the toilet were highlighted as the standard practice for the Participants in this study. Katie and Lily both described this task to be a *'nightmare'* and identified that they always had to ask someone for directions. Evie said she often had to seek out a member of staff for help to get to the toilets, which she found to be *'pretty embarrassing and awkward'.* Alfie stated: *'I wouldn't have a clue how to find the toilet by myself'* and acknowledged that he always relied on someone else to take him to the toilet.

Lily highlighted that in many cases, going to the toilet was not an option for her, as she feared getting lost if she deviated from her principal journey route.

Way-finder's Questions: *Where are the toilets?* was dependant on identification communication and *How do I get to the toilets?* was dependant on navigation communication.

In addition, the difficulties faced by the Participants in identifying and returning to the original journey route, from the toilet, highlighted the weakness in communication to support orientation and navigation upon exiting such En-Route Destinations and attempting to return to the original journey path.

[En.D.T.1.2.1.1] Using the Disabled Toilet

A two-part Way-finding Hot-spot regarding: 1. the use of the disabled toilet by people with visual loss, and 2. the location of the disabled toilet, was highlighted by Participants.

In contrast to Bichard et al. (2008) who found that people with visual loss preferred not to use the disabled toilet because they are too spacious, this study found that using the disabled toilet was often the only choice for Participants Katie and Alfie.

Katie explained: *'I like to take Bruno right into the toilets with me and because the cubicles are so small I often use the disabled toilet.'*

Alfie stated: *'My wife takes me to the toilet so we have to use the disabled toilet...she can't be going into the males now can she?'* Alfie highlighted a further problem regarding the location of the disabled toilets, he explained: *'Males are sometimes guided by females and females are sometimes guided by males. If the disabled toilet is in with the regular cubicles then that causes us real problems. I have been in toilets where there has been a male disabled toilet inside the rest of the male cubicles. So you have to walk past all of the urinals to get to the toilet. If you are being guided by a woman- mostly it's my wife who guides me- then that doesn't work. So we usually have to go to the ladies 'cause I can't see but she can.'*

In asking: *How do I get to the Disabled Toilet?* Participants' highlighted the importance of unisex disabled toilets being positioned independently from the 'regular' male and female cubicles. Additionally a form of navigation communication, to enable Participants to find the disabled toilet was identified as missing.

[En.D.T.1.2.2] Distinguishing between Male and Female Toilets

Way-finder's Question: *Which is the Male/Female toilet?* was raised by Participants Way-Finding Hotspots. Identification communications failed to appropriately and effectively assist Alfie, Evie and Lily in distinguishing between the gender of toilets. Alfie explained: *'toilets are awful I can't tell the difference between the males and females'*.

Evie stated: '*Just using the toilet signs on doors isn't easy when trying to define male and female'*. She described an embarrassing encounter which was the result of this inability to differentiate: '*I was in an airport with my blind friend and off we went to the toilet. I followed behind her. First of all obviously we couldn't see any signage to find them, but we got there. But the next thing I heard was a voice saying, "What are you doing in here?" My friend, half laughing half mortified said, "Oh, don't worry, I can't see anything". But there was nothing to tell us on the door which toilet was which. We both had a laugh about it.'*

As with Alfie and Katie, Lily asserted that *'there is no way of telling which is the "girls" or which is the "boys".'* As a result of this, Lily employed a strategy of *'watching which way the girls go'* as a means of not having to rely on asking someone to direct or guide her to the toilet.

Lily identified weaknesses in existing forms of toilet communication and described difficulties when trying to interpret graphics and text on toilet doors: *'I can't tell from the picture outline whether it's a man or a woman toilet and fancy text is not easy to read'* she explained.

Evie suggested that design solutions could be incorporated or adopted into public toilet design to help address and overcome weaknesses relating to toilet identification: '*I am sure they could do something about toilet door handles or create something which works to define these areas. Something so that when you put out your hand you could be touching something that would define ladies from men's. Like an L-shaped handle for the ladies. [...] it's hard to overcome the 'his' and 'her' definition with Braille.'*

She spoke about technology aids and added: *'In a public bathroom, as you touch the door it could say "ladies" [...] and that would tell you if you were entering the ladies.'*

[En.D.T.1.2.3] Using the Bathroom/Toilet/Fixtures and Fittings

Findings in keeping with Bichard et al.(2008) who found that people with visual loss use a strategy were they 'feel around the toilet cubical to aid themselves in locating the fixtures and fittings within the cubicle'(2008,p. 80) was also an identified tactic used in this study. However, Alfie described a situation where this strategy failed him:

'I have been to the toilet in the disabled cubical and spent ages trying to find the loo roll and then trying to find the flush and then the basin and then the door again. Sometimes they are so spacious, they have to be for people in wheelchairs, but sometimes they are so spacious you can't find anything. Once or twice I have had to go back out to get my wife to come in to help me find the flush of the toilet because I just couldn't find it. It turned out to be one of those sensor flushes; there is no way that I would have found it.'

Similarly, Bichard et al. (2008) reported a potentially embarrassing instance when a respondent in their study was faced by a dilemma when not able to find the toilet flush. Should they leave the toilet un-flushed or should they find a member of staff to assist?

Lack of instruction communication to enable Participants to become familiar with the layout of the toilet was raised as an issue when trying to locate and operate fittings and fixtures of a toilet. Way-finder's Question: *What do I do to use the fixtures & fittings in the Bathroom?* was evidenced by the Way-finding Hot-spots. In addition to the problem that 'instructions on operating senor devices are not inclusive' (Bichard et al., 2008,p. 83), Alfie stated that relying on previous experience of toilets was not an option as, *'they are always designed differently'.*

[En.D.T.1.3] Exiting the Building in an Emergency: Knowing What To Do

A distinct lack of [En.D.T.1.3] Knowing What To Do in the Case of an Emergency was highlighted by the Participants in this study. Instruction communication regarding what building occupants should do in Case of Emergency was highlighted as deficient.

James, Alfie and Jack stated they would always have to rely on someone else to help them in an emergency. Jack explained: *'I have never been put in the real life situation of there being a fire. I don't know how good I would be at figuring it out. [...]Dave is with me,* [so] *I will be ok.'*

Dave said he always formed an *'emergency exit plan'* to get him and Jack out of a building. *'I am always looking for the exit points in case we need to get out quickly.'*

Evie described a situation when she was in hospital and there was a fire which caused all the doors to lock. She explained the *'mass panic'* that ensued, due to occupants being unaware the doors would lock in event of an emergency: *'we could smell the smoke and everything. [...] It was really stressful and very* scary.*'*

Lily identified that she was not able to read fire-exit signage because of the colours green and white [figure 4.16]. She highlighted a need to be told what to do in the case of emergency as soon as she entered a building: *'Normally in case of an emergency they say "follow the emergency signs" - but [...] I can't see them. I just say "so where would they be exactly?" [...] green with white writing are the worst colours for me.'*

She added: *'I suppose in buildings they think that you must just follow the crowd - or assume that the people around you know that you are blind - and [...] that people will help you. But that isn't always the case - especially in case of an emergency. They should tell you what to do as soon as you walk in...like they do on a plane – the safety demonstration.'*

Figure 4.16: Fire Exit Signage

[Researchers Photograph]

Katie described her sense of distress and frustration of being instructed to wait in a refuge area – her fear being, *'in a large building over several floors - will I be left here?'* She added: *'Disabled people who are mobile shouldn't have to be crowded in to refuge areas if they are capable of using stairs. I have the "D* [disabled] *label" so I am told to go there.'* As with some of the other Participants, Katie highlighted the difficulties she encountered when trying to find the fire stairs and exit points, stating: *'unless you know where the fire stairs are, you would be struggling to find them in the event of a fire'.*

In contrast to Katie, Jack emphasised that he always ensured to locate the refuge points within any building: '*You always need to keep your wits about you when you are in a building. I know where the refuge areas are, especially in new buildings. Me and Dave figure it out.'*

Jack, Katie and Lily highlighted that when in an emergency *"fire"* situation, they use the audio from the fire alarm as a navigational sound guide to find a refuge area. Jack pointed out that the downside of the '*sound guide'* being placed within the refuge area was the *'deafening alarm'*. He suggested that ear defenders should be provided to protect hearing of those who rely on refuge areas in an emergency adding: *'you could go deaf waiting for someone to rescue you'.* Katie suggested that audio announcements along with the alarm could also aid her in finding *'fire zones'*. She asked, '*would it not be possible to have recordings such as "fire exit" or "fire stairs" which are activated simultaneously with the fire alarm?*'

Katie, Evie, James and Adam stated that contrasting tactile tiles and colours on walls and doors can aid them to find an exit or hint *'oh here is something I need to pay attention to'* [Katie]. Evie elaborated: *'So that the blind or partially sighted person gets a warning, it's useful to have tactile and colour co-ordinated areas to indicate fire exits'.*

Adam, Lily and Katie identified that emergency lighting activated in the event of a fire – *'like the strips which light up when you're on a plane'* [Lily] – is more helpful than signage. Adam supported this idea, with him suggesting - *'for somebody with partial sight, smoke or dark or bright lights on the ceiling would be a problem. But lights in the floor can light up a clear way of leaving the building'.*

These statements highlighted that a form of instruction communication available in the Entrance area of a building would aid to inform of the *'emergency exit strategy'* of that building. Participants also identified that communication via: tactile, colour, sound, and lighting, could aid them to exit the building in the Case of an Emergency.

4.2.4 Journey Stage
Non-Specific

Journey Stage: Non-Specific was comprised of Way-finding Hot-spots which were not specific, particular or exclusive to a definable Journey Stage [i.e. Approach or Destination].

Non-Specific Task Components/Way-finding Hot-spots were generic, continuous occurrences or unclassifiable, sporadic events which were not particular to a single specific Journey Stage.

Using Table 4.4 as a summarised guide, the hierarchy of Task Components and Communication Requirements evidenced within Journey Stage: Non-Specific is now discussed.

Journey Stage		Way-finding Task Component [Way-finding Hot-spot]	Communication Requirement [Way-finders Question and Communication Need]	
Non-Specific				
	N/S.T.1	**Finding and Following a Route through the Journey**		
	N/S.T.1.1	**Finding and Following a Route Through: Building Layout**	*Where am I in the context of this building layout?*	**Orientation**
			How do I advance my journey through this building layout?	**Navigation**
	N/S.T.1.1.1	Understanding when Layouts Change	*Will I be able to identify and plan/understand if a layout changes?*	**Identification Orientation Warning Instruction Navigation**
			Have way-finding communications been updated?	
	N/S.T.1.2	**Finding and Following a Route Through: Volume**	*Where am I in the context of this Volume?*	**Orientation**
			How do I advance my journey through this Volume?	**Navigation**
	N/S.T.1.3	**Finding and Following a Route Through: Spatial Depth/Distance**	*Where am I in the context of this Distance?*	**Orientation**
			How do I advance my journey through this Distance?	**Navigation**
	N/S.T.1.4	**Finding and Following a Route Through: Corridors**	*Where am I in the context of this corridor?*	**Orientation**
			How do I advance my journey through this corridor?	**Navigation**

Table 4.4: Charting of a Way-finding Journey: Non-Specific/01

Journey Stage		Way-finding Task Component [Way-finding Hot-spot]	Communication Requirement [Way-finders Question and Communication Need]	
Non-Specific				
	[N/S.T.2]	**Using Public Spaces and Avoiding Private Spaces**		
			Should I be in this area -Is this a Public or Private area?	**Identification**
	[N/S.T.3]	**Dealing with being Lost or Disorientated**		
			Where am I - am I lost?	**Orientation**
			How do I become un-lost?	**Navigation**
	[N/S.T.4]	**Going Through a Door**		
			What do I do to get through this door?	**Instruction**
	[N/S.T.5]	**Negotiating a Change in Level**		
	N/S.T.5.1	**Using the Stairs**		
	N/S.T.5.1.1	Finding and 'Marking out' the Stairs	*How do I get to the stairs?*	**Navigation**
			Where am I on these stairs?	**Orientation**
			Is this stair going up or down?	**Identification**
			Is this a stair or a landing?	**Identification**
	N/S.T.5.1.2	Avoiding and Dealing with Stair Hazards	*Are there any hazards on these stairs where are they?*	**Warning**
	N/S.T.5.1.3	Using the Handrail	*How do I get to the handrail?*	**Navigation**
	N/S.T.5.2	**Using Lifts**	*How do I get to the lift?*	**Navigation**

Table 4.4: Charting of a Way-finding Journey: Non-Specific/02

Journey Stage		Way-finding Task Component [Way-finding Hot-spot]		Communication Requirement [Way-finders Question and Communication Need]	
Non-Specific	[N/S.T.5.2.1]	Using Lifts: Knowing what to do	Being In a lift	*What floor do I want to go to in relation to the floor I am on?*	**Orientation**
				What do I have to do in this lift to get to that floor - What button do I press?	**Instruction**
				How do I get to the floor I want to be on?	**Navigation**
			Exiting the lift	*What floor is this? Is this the floor I want to be on? What is on this floor?*	**Identification**
				Where am I on this floor, what do I do now?	**Orientation**
	[N/S.T.5.3]	**Using a Ramp**		*Is this a step or a ramp?*	**Identification**
	[N/S.T.5.4]	**Using Escalators & Moving Walkways**		*How do I know if I am at the end of the moving walkway/escalator?*	**Instruction**
	[N/S.T.6]	**Avoiding and Dealing with Hazards**			
	[N/S.T.6.1]	**Avoiding and Dealing with Hazards: Floor**		*Are there any hazards? Where are they? What are they? Are they temporary or permanent? What do I do?*	**Warning**
	[N/S.T.6.2]	**Avoiding and Dealing with Hazards: Walls**			**Identification**
	[N/S.T.6.3]	**Avoiding and Dealing with Hazards: Lighting**			**Identification**
	[N/S.T.6.4]	**Avoiding and Dealing with Hazards: Other People**			**Instruction**
	[N/S.T.7]	**Collecting Information to Way-Find By**			
	[N/S.T.7.1]	**Using Landmarks**		*Can I use these landmarks as way-finding cues?*	**Identification Orientation Navigation Instruction Warning**
	[N/S.T.7.2]	**Using Visual Signage**		*Can I use these signs as way-finding cues?*	
	[N/S.T.7.3]	**Using Tactile Cues**		*Can I use these textures as way-finding cues?*	
	[N/S.T.7.4]	**Using Audio Cues**		*Can I use these audio announcements as way-finding cues?*	
	[N/S.T.7.5]	**Relying On Others**		*Can I use another person as a provider of way-finding cues?*	

Table 4.4: Charting of a Way-finding Journey: Non-Specific/03

[N/S.T.1] Finding and Following a Route through the Journey

Participants' experienced Way-finding Hot-spots when [N/S.T.1] Finding and Following a Route through the Journey. This Task Component was broken down into five sub-tasks:

Finding and Following a Route Through:

[N/S.T.1.1] Building Layout

[N/S.T.1.2] Volume

[N/S.T.1.3] Spatial Depth/Distance

[N/S.T.1.4] Corridors

The *finding* component of these Tasks was found to be dependent on orientation communication whilst the *following* component was reliant on navigation communication.

[N/S.T.1.1] Finding and Following a Route Through: Building Layout

Katie explained she often struggled to understand the location of her immediate surroundings within the context of an entire building. She found it *'tricky'* to orientate herself: *'I lose my orientation and don't know if I am at the back of the building or the front of the building. It is really quite confusing'* she stated.

Adam also highlighted that a lack of appropriate orientation communication made him acutely more aware of his visual loss: *'public buildings usually accentuate my loss of sight when I'm getting through a matrix of corridors and rooms. If I don't know where I am in it all it makes me more aware of all the things that I need to see – signage and stuff - but can't.'*

Ben experienced difficulty in trying to orientate with regard to the wider building context. He described the impact of not being able to find and follow a route through: *'at first I thought*

“this will be easy and I will have no problems” [...] It was actually really difficult. [...]I’d walk down a corridor and think...“Oh I have seen this before” ...so I must have looked like an idiot.’

The means by which a building layout is communicated was a factor which affected Participant’s ability to find and follow a route through a Layout. Adam expressed the opinion that a clear understanding of the immediate context layout specific to each journey, rendered knowledge of the overall building layout unnecessary. He explained, ‘*building layouts can be really confusing and quite hard to read sometimes if there is nothing breaking them up for me. I find that building layouts don’t really matter. [...] I just need to know the bits I need to know. [...] “this area is this and that area is that” [...]’.*

When comparing Way-finding in a familiar layout to that undertaken in an unfamiliar layout, Adam explained that he used different strategies when getting through: *‘You feel more comfortable in a building you know. You train yourself to remember things about that building [...]. In an unknown building it’s a case of grasping all the information.’*

As illustrated in figure 4.17, Adam explained this strategy further: *‘It’s like a jig-saw...I can’t see very well so for me, way-finding through is a task of grabbing all the other information-all the smells and everything I can touch. Then I have to add it all together to be able to way-find through it all.’*

Adam’s strategy of piecing together the *jig-saw pieces* of a way-finding task was reinforced – and developed upon – by Katie’s experiences. She explained the benefit of dividing a building into smaller sections: ‘*A sense of logic is good... layouts which are marked-out and broken-up make it dead easy to count and locate exactly where you are.’*

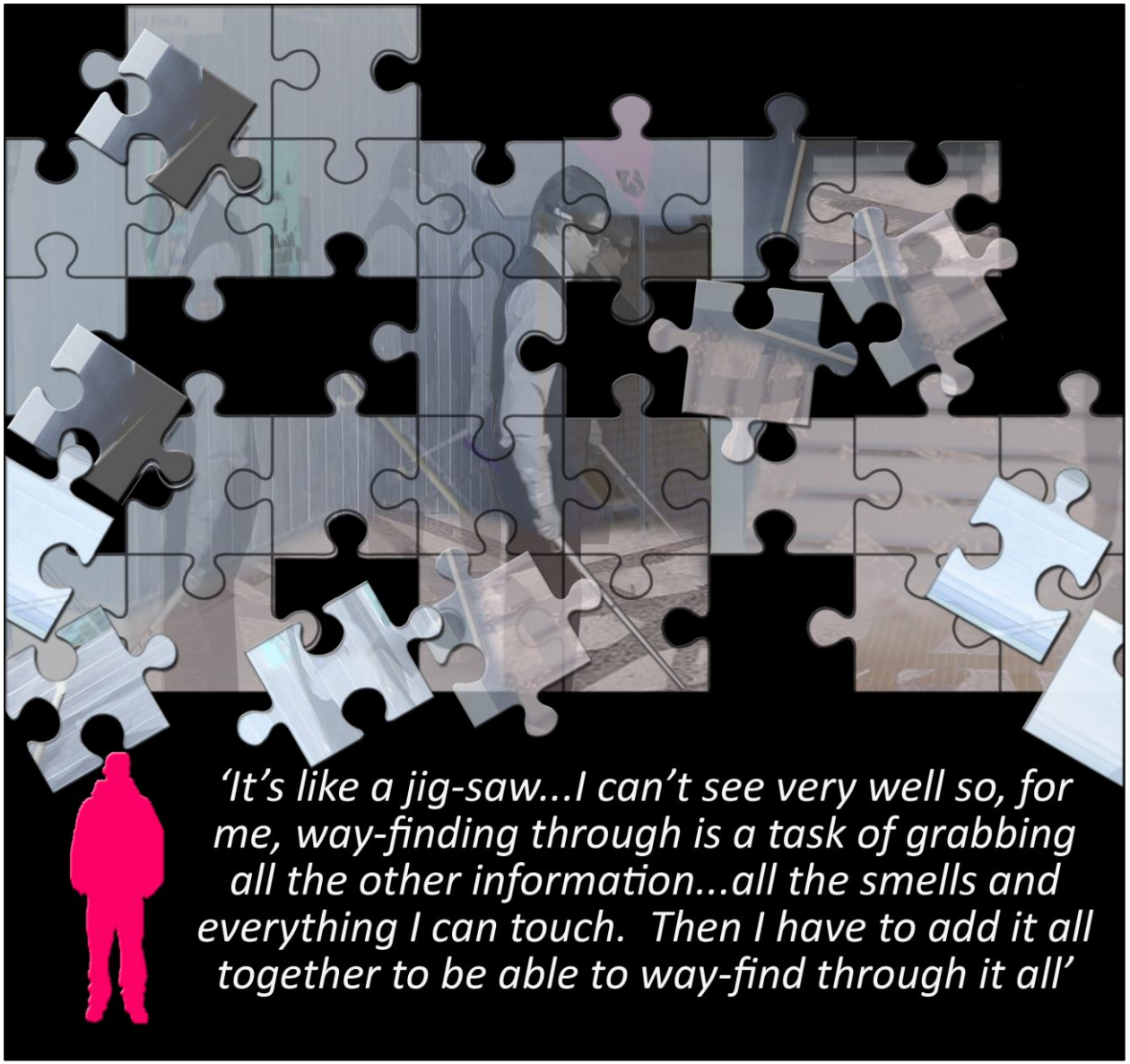


Figure 4.17: Adam Describing the Task of Finding and Following a Route through an Unfamiliar Layout

Katie also highlighted that orientation points prevented her from becoming lost: '*trying to find your way round or out of a building when you have no sight is difficult when the design is random. Rabbit warren, higgledy-piggledy buildings are more difficult to get around...unless there are points to tell me "3rd floor" or that I am near the canteen.'*

In response to Way-finder's Questions: *Where am I in the context of this building layout? How do I advance my journey through this building layout?* a lack of orientation and navigation communication was identified as impacting on experience of Finding and Following a Route Through: Layout.

[N/S.T.1.1.1] Understanding When Layouts Change

As a sub-task of [N/S.T.1.2] Finding and Following a Route through: Layout, [N/S.T.1.2.1] Understanding When Layouts Change, emerged based on the Way-finding Hot-spots Participants experienced when the once familiar, without indication, became unfamiliar.

Lily, Evie and Grace expressed frustrations when not able to rely on existing knowledge of surroundings because they had changed in use/function, or the building layout had been altered since their previous visit.

Lily explained: *'If a building changes in some way - like if there are more rooms - then it's very annoying and quite exhausting 'cause I have to learn it all over again.'*

Evie's experiences supported Lily's point, she described her strategy was to treat the once familiar layout as an unfamiliar setting: *'I would just have to get my friend to show me the way again... like I would do in a building I don't know. I would remember it for the next time and hope it doesn't change again'* she said.

Grace described her experience of Way-finding Hot-spots resulting from communications which failed to be updated when a building changed: *'I had to come in through a new door and none of the signage matched. It was rubbish 'cause there are old bits of signage and stuff which belonged to the "old building" and they didn't fit in with the "new building" ...so you can't tell what is going on. Old signs lead you the wrong way...I got totally confused.'*

She identified that this experience impacted on the rest of her ability of way-finding through a building as it caused uncertainty: '*because of a wee change I am questioning myself all the way around... "Am I going the right way?" "Am I wasting my time?" "Is this the right staircase?"*

These experiences indicated that if a building changes, then way-finding communication should be updated to match and relate to the reconfigured layout.

There is a requirement for up-dated communications [navigation, orientation, warning, instructional and identification] to answer Way-finder's Questions: *Will I be able to identify and plan/understand if a layout changes? Have way-finding communications been updated*? It was also highlighted that redundant communications should be removed to avoid confusion.

[N/S.T.1.2]Finding and Following a Route Through: Spatial Volume

It was identified during the study that Spatial Volume [height of a space/room etc.] had a significant impact on the Participants' abilities when [N/S.T.1] Finding and Following a Route.

Adam highlighted that he did not enjoy being in *'open spaces and voids which go all the way through a building.'* He described Way-finding Hot-spots he had experienced when trying to orientate within Spatial Volume: *'It is so distressing and I get embarrassed 'cause I can't figure out where I am in all of it.'*

In addition to the *'nightmare'* of locating herself within the context of a *'huge space'*, Katie also had problems in being able to locate building elements such as staircases, she explained: *'first of all you have no sense where you are in all of it* [the spatial volume] *and it's then hard to find things like stairs or the lift or even doors sometimes.'*

Katie identified that as a strategy *'to find things'*, she often used sound when way-finding through spaces. This tactic however, failed her when she was in a *'volumous space'*. She explained that because the sound bounced and echoed in the larger volume, her locating clues would disappear: *'For someone who can't see it feels like such a big open space. You have no reference points; it is too big to use your hearing to hear where the building line is. It's too noisy to hear where the building line is because it becomes that sort of echo, and you can't hear it.'* She continued: *'It makes me feel really uncomfortable.'*

In response to Way-finder's Questions: *Where am I in the context of this volume? How do I advance my journey through this volume?* a requirement of orientation and navigation communication was highlighted. Participants also identified that a *'volumous'* [Katie] space, which was not broken-up, impacted on their ability of Finding and Following a Route Through: Spatial Volume.

[N/S.T.1.3] Finding and Following a Route Through: Spatial Depth/ Distance

Ability to judge and estimate Spatial Depth and Distance within the context of a space affected Participants' ability to way-find.

Adam, Lily and Jack referred to instances where they struggled to estimate distance due to lack of orientation and navigation support from their surroundings. Adam explained *'it's difficult to focus on things which are far away and it makes it difficult to work out distances and where I need to get to'.* He added, *'busy spaces are even worse and make it more*

difficult to get through. I can't usually see faces that well so *can't see what direction people are headed...I get so frustrated and annoyed sometimes'.*

Lily also had problems in being able to *'visually estimate distance'* and explained she had *'really awful depth perception'* which resulted in her not being able to mark-out and estimate *'where things were'*. She explained that using a strategy of counting her steps gave her a *'rough idea'* of the distance to and from elements in a building, she stated: *'I will count how many steps I take from the door and I will count the same number to get back out'.*

Jack also experienced problems when estimating how long it will take him to travel through a large distance of space. He highlighted that if an area is divided up then it is easier for him to guess how far away something is: *'When something is quite far away, I have no clue how far away it actually is so I don't know how long it's going to take me to get there. When a big area is divided up its easier for me - like if I can see four bins and then there is a door – then I can kinda guess the distance to the first bin and then guess how far away the door is.'*

Participant's utilised different strategies of breaking down a Way-finding Journey - from perceiving the scale of a larger way-finding/route element, to negotiating within a much smaller, specific context. This was highlighted by Alfie, who described how he *'can touch a wall and think "right 3 steps and I can reach the door".'*

In response to Way-finder's Questions: Wh*ere am I in the context of this distance? How do I advance my journey through this distance?* a requirement of orientation and navigation communication was highlighted.

[N/S.T.1.4] Finding and Following a Route Through: Corridors

Participants had mixed opinion in regard to whether corridors provided a sense of security or created feelings of apprehension.

Katie explained that she felt comforted when she was in a corridor because she was able to estimate the boundaries of the space around her.

As illustrated in figure 4.18, she explained: *'When you are in a corridor you have got definition at the sides, front and back. It is far easier to feel safe and it is easier to concentrate and to figure out "how do I get from A to B?"'*

In contrast to Katie, Grace, Lily, Ben and Adam found all corridors to be uncomfortable spaces which *'forced'* [Grace] *'funnelled'* [Lily] and *'directed'* [Ben] movement.

When walking through the corridors during the way-finding task Grace described her anxiety explaining: *'I hate being forced through corridors. I was just wondering all the way along: "have I passed where I am supposed to go" - but I just have to keep going till I get to the end'.*

Adam explained: *'There are a lot of offices, long corridors and doors [...]. You have to follow the wall [...] but you aren't sure where it's going to take you.'*

Lily and Ben also shared these feelings of uncertainty, with Lily stating: *'I felt sometimes like I was walking and I wasn't even sure if I was going in the right direction - I just kept going.'*

Ben's statement supported this: *'The corridors kind of pushed me along a bit. I seemed to walk quicker down corridors to get to the end...they direct you I suppose. But you don't know if you are going in the right way.'*

In response to Way-finder's Questions: *Where am I in the context of this corridor? How do I advance my journey through this corridor?* a lack of orientation and navigation communication impacted on ability of Finding and Following a Route Through: Corridors.

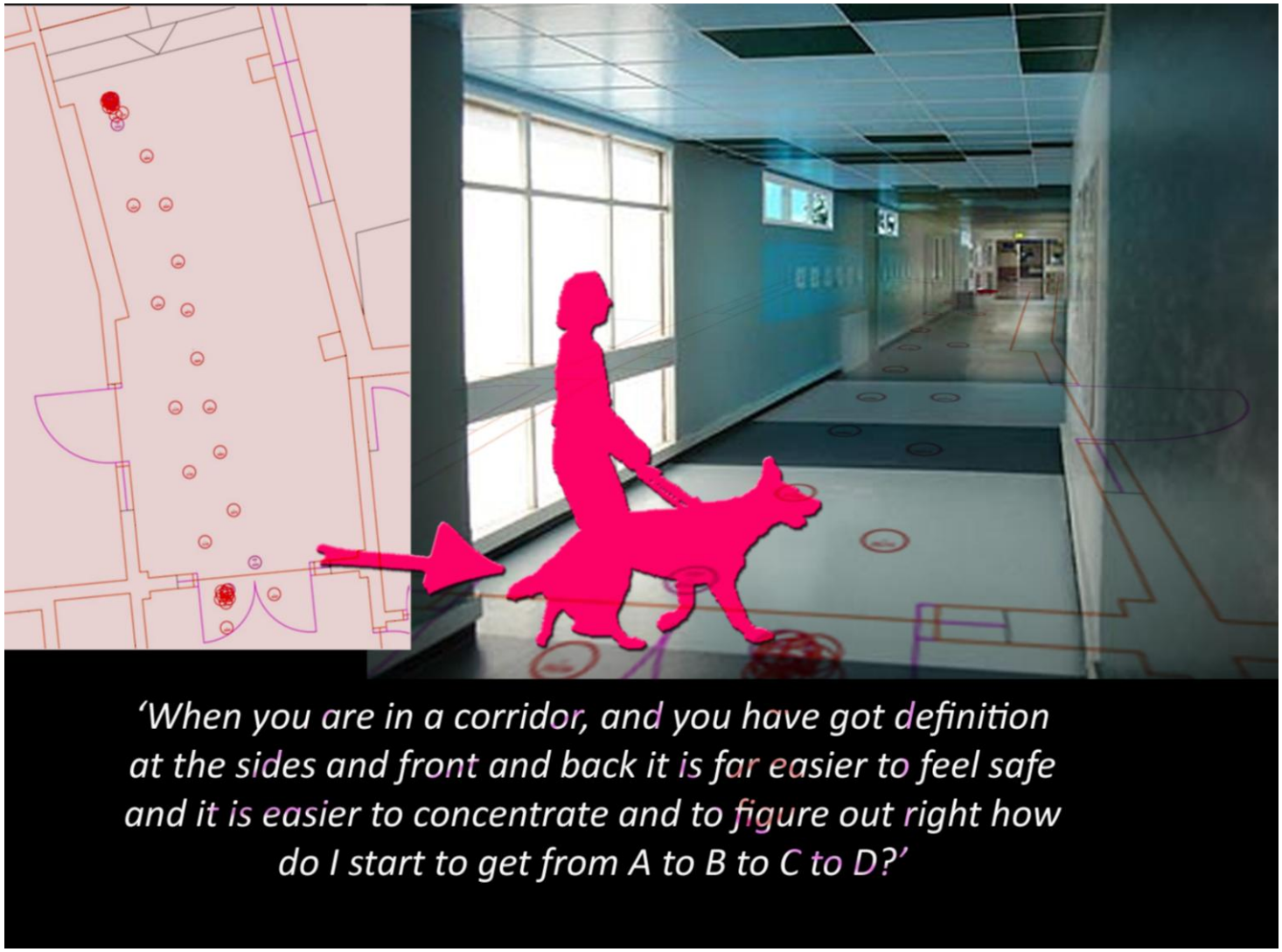


Figure 4.18: Katie's Experience of Corridors

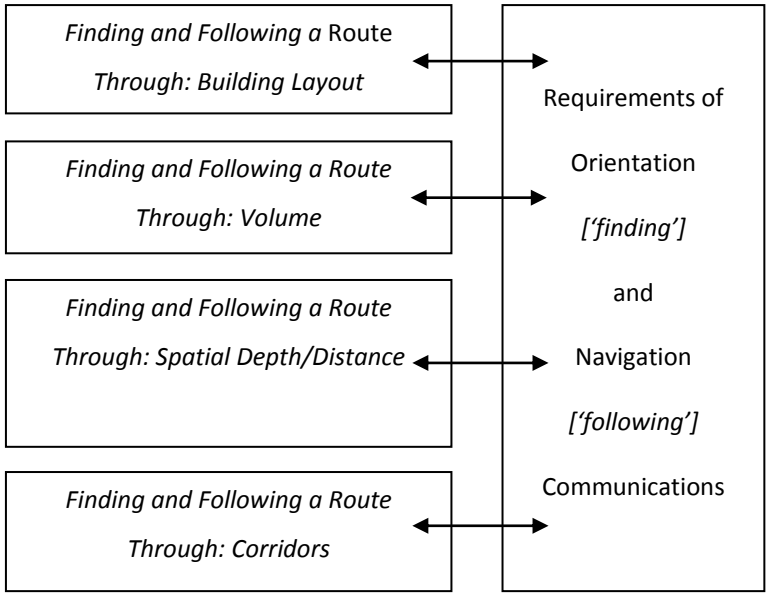


Figure 4.19: Sub-tasks of Finding and Following a Route through the Journey

In summary, and to distil the Communication Requirements of [N/S.T.1] Finding and Following a Route through the Journey, the sub-task experiences [figure 4.19] highlighted that complexity of the building was, in itself, not the cause of Way-finding Hot-spots. Instead the problems experienced were the result of a series of different missing forms of communications. It was highlighted by Participants that if spaces are broken down by points of orientation and navigation, then Way-finding Journeys become less demanding.

[N/S.T.2] Using Public Spaces and Avoiding Private Spaces

Identification of public spaces and avoidance of entering into private spaces was a task of [N/S.T.2] Using Public Spaces and Avoiding Private Spaces which emerged based on some 'embarrassing' Way-finding Hot-spots.

Adam described his feelings when he found himself in a room where he should not have been. He explained: *'nothing stopped me from going in there, there was nothing saying "this is private". It just looked and felt the same way as the place I had entered it from....this was so embarrassing!'* He implied that this was a frequent occurrence for him and explained that when in this situation, he would not leave the room immediately: *'I would maybe spend a few minutes in there so no one who is actually supposed to be in there thinks I'm strange'.*

Grace explained: *'There is always this thing in an unknown building... you might walk into a particular part of a building and think – "oh am I in a private area" – or – "this is a public area". And you think "should I even be in here?" It's embarrassing 'cause other people are maybe thinking..."who are you and why are you in here?"* She found this experience to be '*disconcerting'* and suggested that *'things aimed at members of the public - like posters'* can aid to communicate the public nature of a space and make her think *"it's ok to be here.'*

During the Way-finding Journey, Grace was confronted with this Way-finding Hot-spot and confessed that although she identified she was entering what she termed a *'private zone'*, stressed she had *'no idea'* how to get to the other side of the building without going into the space in question. She explained: *'There was a sign saying, "Please don't walk through this corridor" and I thought... "right I need to get to that side of the building and this sign is blocking me from getting there...what will I do?" I opened the door and ran for it. It was so stressful but I just didn't know any other way of getting to that side of the building. I just knew I had to get there and because there were no clear signs to get there any other way...I just ran.'*

James described how he suddenly stopped because his surroundings made him feel that he was in a *'private area'*, when in fact he was still within a public route. He explained: *'It felt like a "non-public area", [...]. The ceiling and the floor felt like they were closer together. The sound was muffled and there were noises - like humming from machines -it was very quiet. I suppose that's why it felt like a "non-public area".'*

Katie experienced a Way-finding Hot-spot during the Way-finding Journey when she entered a private office where two people were having a meeting. She explained: *'I just said "oops sorry", and they started patting Bruno...so it wasn't that bad. But I thought I was entering a more public room [...] 'cause it felt open and inviting [...].'*

Immediately after this event, she experienced another Way-finding Hot-spot when she was deliberately looking for a private office to ask for directions. Instead of entering through the door of a private office, she walked in through the public door of a set of toilets. She described what happened: *'That was funny but it could have been really embarrassing... I ended up walking into the ladies loo- which could have as easily have been a gent's loo [...]'.*

There was nothing to tell me that that was a woman's rather than a man's...or a bathroom rather than an office. It was a door that opened, so I went in... It was as simple as that.'

To mitigate this Way-finding Hot-spot Katie suggested: '*doors could communicate more than they do. They are the last chance to pre-warn someone that they are about to walk into a private area. They could mark places I can go and places I shouldn't'.*

In response to Way-finders Question's: Should I be in this area? Is this a Public or Private area? a lack of identification communication to differentiate between *public* or *private* space/rooms/areas was highlighted as missing.

[N/S.T.3] Dealing with being Lost or Disorientated

Becoming lost, or fear relating to losing one's way, was highlighted as having particular impact on Participant's feeling of security and emotional well-being when undertaking a Way-finding Journey.

Lily explained: '*I hate the feeling of I've gone wrong somewhere'. I am frantically running about and I am so frustrated with myself. I get stressed out when I get lost...and I get lost all the time. I miss wee bits of information 'cause I can't see...it's frustrating!'*

Despite feelings of frustration James explained that he never felt scared of becoming lost and stated: *'Orientation and Mobility training means that I can always keep myself safe. [...] I just have to figure out how to get onto the right track again.'*

Emma explained that if she got lost, she had a two-point strategy: '*I would try to retrace my steps if I got lost...or if that failed I would try and find someone to help.'*

Adam identified that getting lost was a regular occurrence for him: *'I give myself five minutes to let my frustrations subside...then I have to figure out how to get un-lost.'* He described his

strategy to become *'un-lost': 'I am quite happy to just charge about, so I will try something else or go some other way... I have an excuse if it all goes wrong'.*

Ben felt he got lost at one point during the Way-finding Journey and explained that he was not able to find any information or anyone to help him get to the Destination: *'It's a bit weird...signage just doesn't relate to the floor levels'.*

Getting lost and lack of orientation communication [in response to Way-finder's Question: *Where am I - am lost?*] and navigation communication [in response to Way-finder's Question *How do I become un-lost?*] impacted on ability of Dealing with being Lost or Disorientated.

[N/S.T.4] Going Through a Door

Participants described Way-finding Hot-spots experienced when [N/S.T.4] Going Through a Door. The position of door handles, figuring out how to open the door and getting through the door were the main issues arising in relation to this specific Task Component.

Throughout the Way-finding Journey, Bruno [Katie's Guide Dog] stopped and sat down in front of every door they were about to walk through. Katie explained: '*Bruno stops to tell me that there is something that I need to pay attention to...like doors or stairs.'*

Katie explained that during the *W*ay-finding Journey, she had problems when trying to locate the door handles. She explained: *'You would have seen me grovelling to find the door handles. I had to really grope around to find the handle every time I came to a door. They were all different types of handles and so were different heights.'*

During the Way-finding Journey, Katie, James, Jack, Evie and Emma repeatedly encountered Way-finding Hot-spots when trying to figure out to *push* or *pull* the door to open it. James explained: *' All the way around...every door I had to go through there is always that stopping*

thing you have to do to stand and push and pull the door...then some bright spark says "it says push" but of course...how can I see that? You just have to learn as you go.'

In echoing some of the Communication Requirements already identified in Journey Stage: Entrance [E.T.1.1.1], and in response to Way-finder's Question: *What do I do to get through this door?* a lack of instruction communication impacted on ability of Going Through a Door.

[N/S.T.5]Negotiating a Change in Level

Participant experiences of [N/S.T.5.1] Using Stairs, [N/S.T.5.2] Using lifts, [N/S.T.5.3] Using Ramps, [N/S.T.5.4] Using Escalators and Moving Walkway highlighted the impact of communications upon Participant experiences of [N/S.T.5] Negotiating a Change in Level.

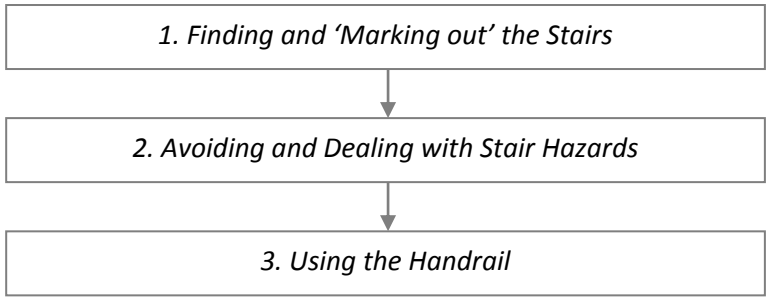


Figure 4.20: Series of Tasks When Using the Stairs

[N/S.T.5.1] Using Stairs

'It is often a common misconception that blind people can't use stairs...but for me there is no other way. Bruno [her guide-dog] *doesn't like lifts [...]. You just have to be cautious when going up or down them.'* [Katie]

As illustrated in figure 4.20 and in relation to [N/S.T.5.1] Using Stairs, Participants' highlighted Way-finding Hot-spots within a succession of Task Components which included: [N/S.T.5.1.1] Finding and Marking Out the Stairs, [N/S.T.5.1.2] Avoiding and Dealing with Stair Hazards, and [N/S.T.5.1.3] Using the Handrail.

[N/S.T.5.1.1] Finding and 'Marking Out' the Stairs

Katie experienced a Way-finding Hot-spot when trying to find and navigate to use the stairs: *'I had no way of knowing where to go, I only realised there were stairs when I heard people coming down them. I was using my hearing a lot. The only problem was that I couldn't use*

my hearing to actually find the stairs. All the echoes took away all the sounds of the edges... I had no idea where the stairs were. All the way along I had to tell Bruno to find them.'

Katie repeatedly used the command *'Find the stairs, Bruno'* throughout the Way-finding Journey as a strategy to find the staircase. Each time, Bruno walked towards and found the stairs and sat down to inform Katie that they had reached them. Katie highlighted another Way-finding Hot-spot when she reached the top of the stairs - she was unable to safely orientate herself within the context of a staircase: *'When I got to the top of the stairs it was my immediate inclination to get away from them as fast as possible 'cause I was frightened of stepping back. I didn't know how wide the stairs were...I couldn't mark them out. I had no reference points […] There was no bevelled edge - No indication as to how far they went across either, so for safety sake I just had to get away from them really.'*

Lily echoed Katie's concerns and explained that she frequently experienced Way-finding Hot-spots of *'falling up and down stairs'* due to not being able to identify and distinguish between a stair and the floor. As a strategy to help her *'read the stairs'*, Evie explained that she used the handrail and explained: *'what I tend to do is always put my hand out ahead of myself and if there is going to be a levelled spot or landing before you go up another set of stairs you can feel the difference in the handrail before it is about to happen. It gives you warning that the stairs will stop for a while. Then the handrail will begin to rise again and you know that the next set of stairs are about to start again.'*

James and Evie both highlighted the benefit provided by tactile communications in assisting them to identify the stairs. James explained: *'Things like ridges at the top and bottom of steps are useful […] you know before you hit- or fall down- a flight of steps that "Oh there is a flight of steps here".'*

Katie's experiences conflicted with this viewpoint. She identified a weakness in tactile communication: *'They sometimes put a corrugated effect on the floor about a metre in front of the stairs but sometimes I walk past it and miss it...either that or sometimes I actually trip on it. Some of them are really hard to detect so they are of no use to me. The only thing I can rely on is Bruno. When he sits I know I have to watch out for something.'* Katie added: *'The other issue of course is "is the stair going up or going down?" obviously 'cause I can't see there is no way for me to know if I have to prepare myself to go up or go down. I just use the dog, I know if he goes up or down because of the handle on his lead.'*

During the Way-finding Journey Emma and Lily experienced Way-finding Hot-spots because they were not able to identify and distinguish between a step and a landing, distinguish between the steps, or identify individual treads/steps. Emma stated: *'I thought I had already reached the landing but tripped and fell 'cause I couldn't see there was another step. […] If they are the same as the floor it is impossible for me to see them. […] I can't tell how far they go down from one step to the next. If [...] steps all merge together then I will fall down them.'*

As illustrated in figure 4.21, Lily explained: *'Stairs and tactile edging is a problem - the edging strip gives the wrong message. The steps in this* [case study] *building are green, then there are black edging strips built into the steps, but they don't put it right at the edge of the step...they set it back a bit. For me this means that the green runs into the green of the next stair below. I can't figure out if the green I am seeing is the step below or the step I am standing on. [...] I can't trust that my foot is going where I think it is going.'*

In regard to *'marking out'* and identifying treads and risers of a stair Alfie stated: *'I hate open stairs 'cause my foot will always go through them'.* He described his strategy: *'I firmly put my full foot on the step. It lets me see where that stair ends and the next one begins.'*

Figure 4.21: Lily's Experience of Tactile Strips on Stairs

As illustrated in figure 4.22, Katie described another Stair related Way-finding Hot-spot: *'Bruno won't go up stairs if they are open in any way or if they are made of glass. He can't see where to put his feet, so he just refuses.'* In this instance Katie explained her only option was to find someone to carry Bruno down and then help her down.

These experiences of [N/S.T.5.1] Using Stairs demonstrated a series of Way-finder's Questions and missing forms of communications.

- *How do I get to the stairs?* - Navigation communication
- *Where am I on these stairs?* - Orientation communication
- *Is this stair going up or down?* - Identification communication
- *Is this a stair or a landing?* - Identification communication

A tactile strip - placed on the edge of individual steps as opposed to being set back into the step - was highlighted by Participants' as a method of good practice which enabled them to distinguish between individual steps.

[N/S.T.5.1.2] Avoiding and Dealing with Stair Hazards

James highlighted a lack of appropriate warning communication regarding a hazard he encountered upon using the stairs. He explained, *'some of them* [the stairs] *were slippy and some of the tiles were cracked and uneven'*. This affected the information James could get back from using his cane and he said he panicked as he was not able to gain warning of this hazard: '*sometimes they put tape on the broken bits so sighted people are aware that they are broken, but there is never anything put down for people who can't see'.*

Way-finder's question: *Are there hazards on these stairs – where are they?* highlighted a requirement for a non/less visual form of warning communication.

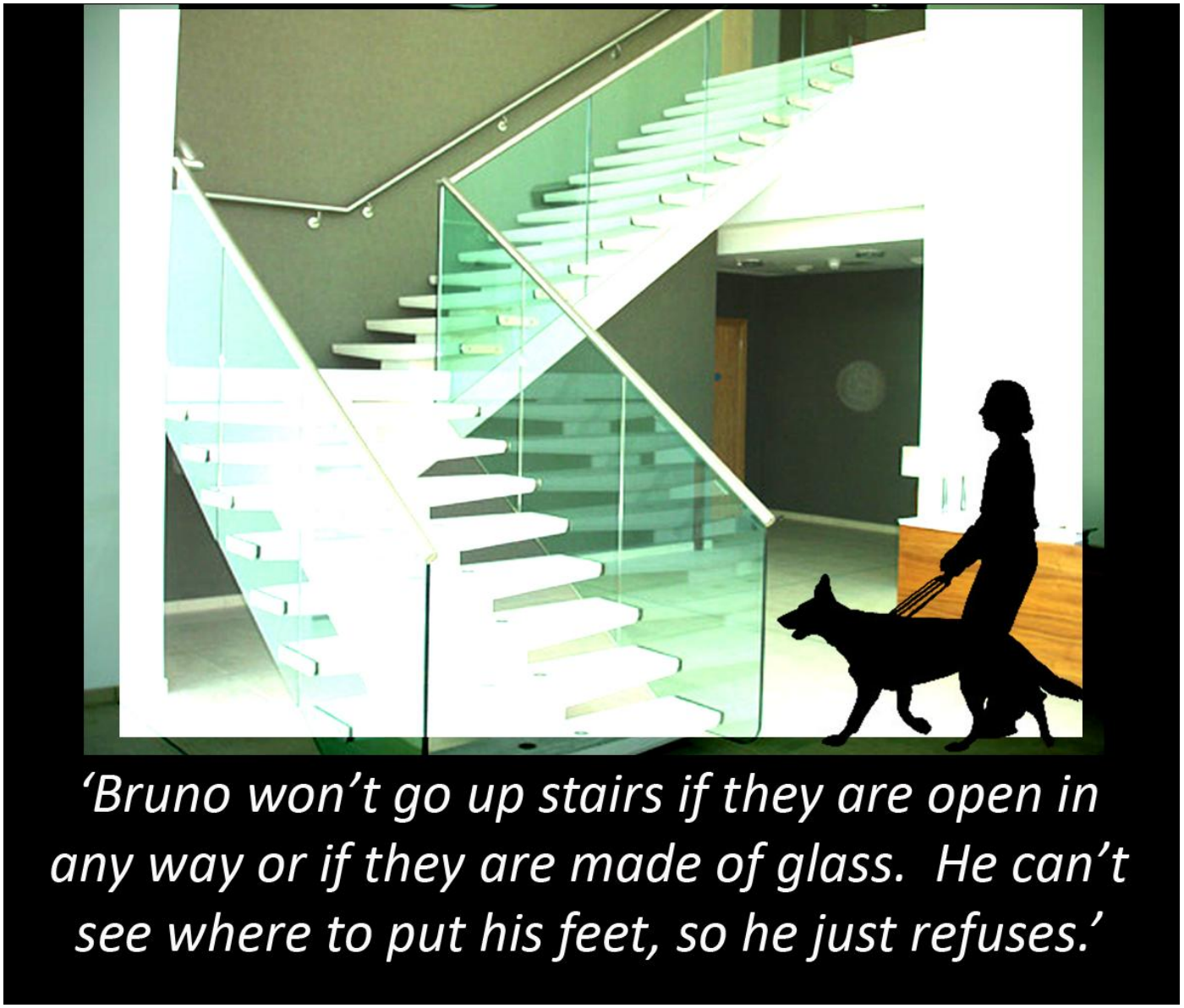


Figure 4.22: Katie's Experience of 'Glass, Open' Stairs

[N/S.T.5.1.3] Using the Handrail

'I like my hand on the handrail and I can use my stick to touch the steps.' [Alfie]

At different points throughout the way-finding journey, Participants experienced way-finding hot-spots when [N/S.T.5.1.4] Using the Handrail.

Katie added: *'Handrails on stairs are helpful especially if I am coming down them. When I go up them it is ok 'cause I can use the dog and the dog's harness.'*

Alfie and James highlighted difficulties they experienced due to the shape of the handrail, and the impact this had on their Way-finding Journey. Alfie stated: '*I couldn't get my hand on the handrail. I normally like to get a good hold of the handrail. But it was too wide for me.'*

James also encountered this problem: *'I couldn't reach the handrail 'cause there was a bin in the way and I couldn't reach across it.'*

Alfie experienced two other Way-finding Hot-spots, he explained: '*I couldn't use one of the handrails 'cause there were leaflets or something on it and if I had put my hand there I might have knocked them over and annoyed someone'* and, as illustrated in figure 4.23: *'The handrail just stopped... I don't know why. I found another bit so it was ok. A handrail on the steps that goes all the way around and doesn't stop and start again in various points is generally quite useful.'*

In response to Way-finder's Question: *How do I get to the handrail?* a lack of navigation communication [*put your hand here*] impacted on ability of Using the Handrail.

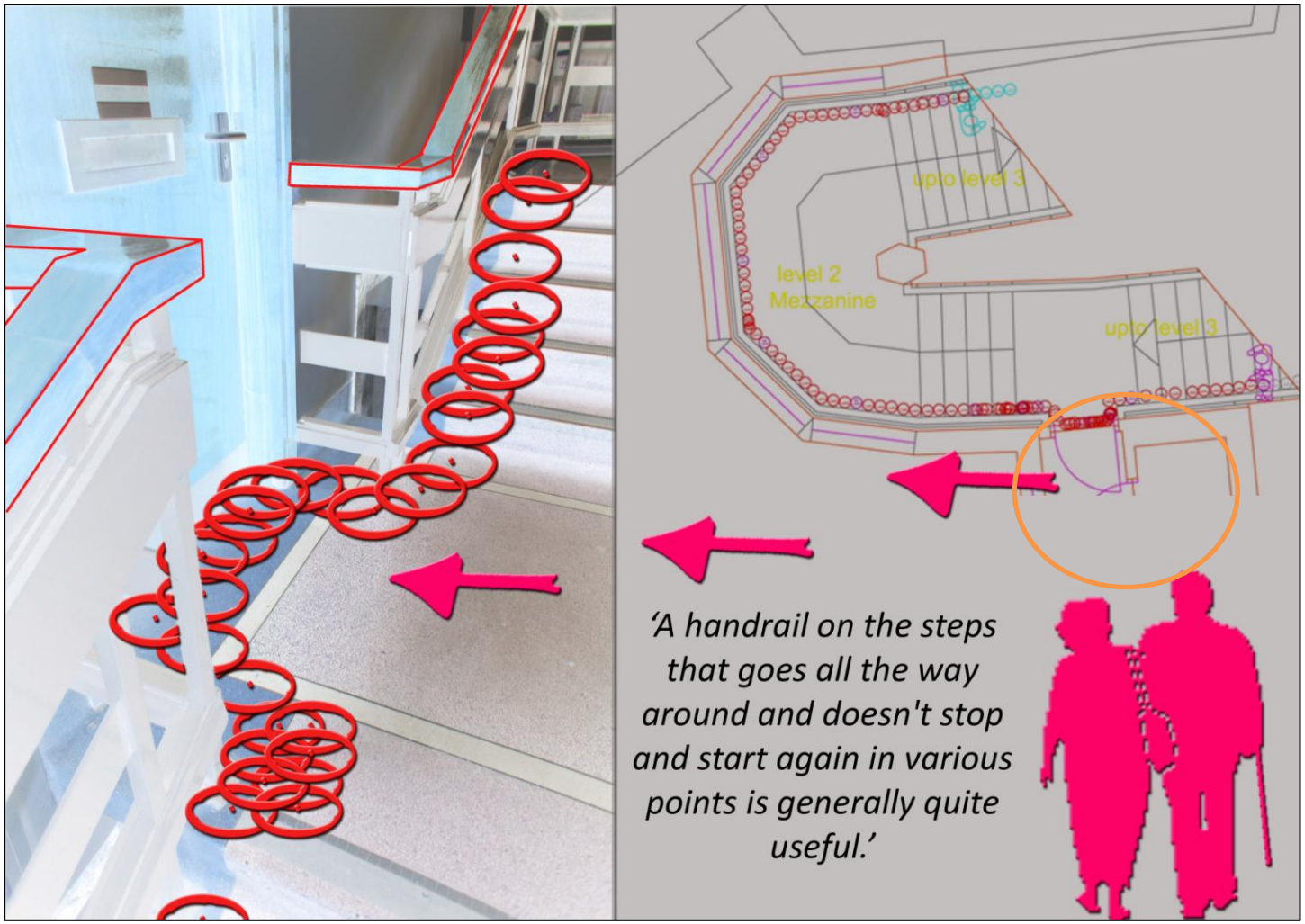


Figure 4.23: Alfie's Experience of a 'Broken' Handrail

In summary, and when drawing out the Task Components of [N/S.T.5.1] Using Stairs, Way-finder's Questions and Communication Requirements are highlighted in figure 4.24.

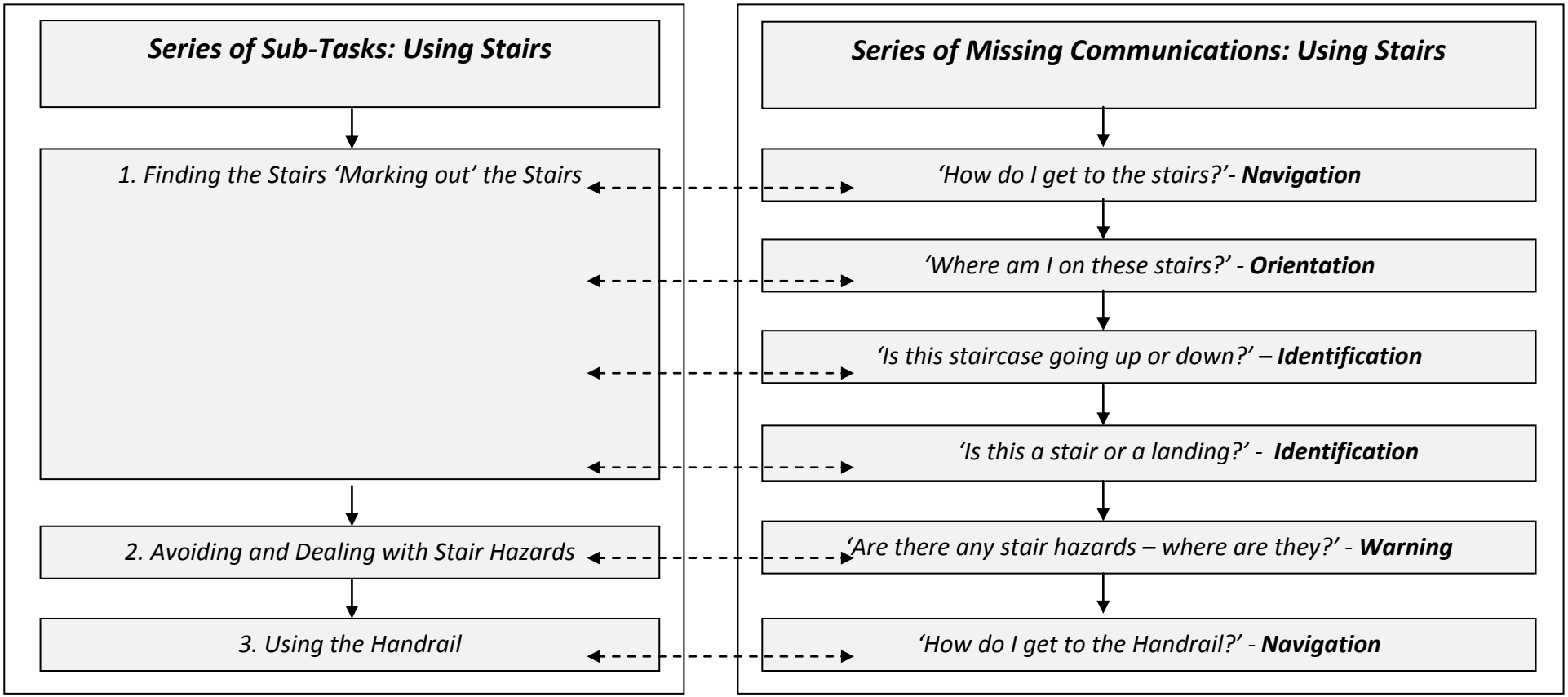


Figure 4.24: Summary of the Communication Requirements of Stairs

[N/S.T.5.2] Using Lifts

There were three main Way-finding Hot-spots Participants identified regarding general experiences when [N/S.T.5.2] Using Lifts: 1. finding the lift; 2. gaining access into and exiting a lift, and 3. not being able to use the lift because it had been turned off.

Evie highlighted difficulty she had when finding lifts, she explained: '*Lifts always seem to be a grey colour. Grey isn't very good - it's not a colour to me. I can't see it, it's not bright.'*

Jack explained that gaining access into and exiting a lift was a problem for him: *'The lifts that you can drive into and drive straight out of are great. [...] I can't get my neck and head around very far to look behind because of the big headrest at the back of my wheelchair. I have problems sometimes in being able to get in and out. Sometimes I have to try to get in at a slight angle so that other people can get in; it can be really difficult sometimes to get actually in and out. It would be great if there was something on the sides of lifts so that I could check the corridors before reversing into it...like wing mirrors'*

Dave described a problem that he and Jack had encountered, previous to the Way-finding Journey, when the only lift in a building had been switched off: '*[...] the only way for us to get out of the building was to use the evacuation chair. They had to get Jack into the evacuation chair and then get his wheelchair down. There was no check in place to see if someone needed to use the lift [...] Jack was left there for two hours.'*

Jack expressed concern at being *'discarded'* and said *'it can be tricky sometimes if you have to rely on a lift like I do… if people turn them off it is a nightmare'.*

These testimonies highlighted weaknesses in navigation communication in response to Way-finder's Question: *How do I get to the* Lift? Additionally these experiences raised awareness of the impact of size and layout of a lift and the consequence of a lift being turned off.

[N/S.T.5.2.1] Using Lifts: Knowing what to do

Once inside the lift, Way-finding Hot-spots caused by not *'knowing what buttons to press in order to get to another floor'* where identified by Lily. She added: *'there is no way of knowing where you are in terms of where you want to be.'*

In addition to highlighting this lack of orientation and navigation communication, she identified a Way-finding Hot-spot regarding a lack of non-visual instructional communication: '*I can't see the numbers, there is nothing except visual stuff - so I don't know what to.'*

Adam also highlighted a lack of orientation and navigation communication being available in a lift and stated that when moving vertically through a building he preferred the stairs: *'More information can be acquired when you're walking about compared with when you're in a lift.'* He added: *'In a lift you need to already know what floor you are on in relation to where you want to go to.'* Katie described a lack of orientation communication: *'[...] sometimes lifts have Braille and raised numbers which is very helpful, but unless something pings and says "1st floor" I often have to try and find someone and ask them what floor I am on.'* She added: *'If I can't find someone then I don't know what floor I am on.'*

Lily and Alfie explained how beneficial forms of identification, orientation and navigation communication were to them when they were in a lift. Lily explained: '*I went in a lift once and there was a man operating the buttons. [...] When we got to the first floor he said: "This is the first floor,* [identification communication] *please get off here if you want…" and he told me what was on that floor* [orientation and navigation communication]. She added: *'This was great for me 'cause I knew where to get off.'* If these communications were missing, Alfie stated: *'I usually don't know what is on each floor in a building. I just have to rely on a sighted person to tell me.'*

These experiences highlighted that there are two stages of using a lift: being in the lift, and exiting the lift. In the first instance - being in the lift - these statements demonstrated a lack of navigation communication in response to Way-finder's Question: *What floor do I want to go to in relation to the floor I am on?* They also evidenced a lack of non-visual instructional communication in response to Way-finder's Question: *How do I get to the floor I want to be on?* and *What do I have to do in this lift to get to that floor-What button do I press?* In the second instance - exiting the lift - it was highlighted by experiences that audio forms of communication would be beneficial if they provided a form of identification communication to answer Way-finder's Question: *What floor is this? Is this the floor I want to be on? What is on this floor?* and orientation communication to answer Way-finder's Question: *Where am I on this floor, what do I do now?*

[N/S.T.5.3] Using a Ramp

Katie and James described Way-finding Hot-spots they had experienced when using a ramp. Katie explained: *'The worst thing is where you have a ramp at the side of the stairs. I have tripped and fallen because I had one foot on the ramp and one on the stairs and didn't know if I was walking on the stairs or the ramp.'*

Jack's experiences added to this Way-finding Hot-spot and echoed Katie's concerns regarding a lack of identification and definition: *'I have to use a ramp 'cause of the wheelchair, but sometimes there is no raised edge or different surface so my wheelchair has rolled off the sides onto steps. This is dangerous 'cause I feel that I am going to fall out of the wheelchair.'*

These experiences highlighted Way-finder's Question: *Is this a step or a ramp?* A lack of identification communication to define and distinguish a step from a ramp was highlighted. Jack suggested that a raised edge or surface change could be a distinguishing feature.

[N/S.T.5.4] Using Escalators & Moving Walkways

Alfie, Evie and Katie identified Way-finding Hot-spots they encountered when using escalators and moving walkways. Alfie recounted an experience he used a moving walkway at an airport: *'They are like hitting a moving target*. *I was with my wife […] she suddenly yelled – "right go" - and then an automated voice said "you are coming to the end of the walkway – caution." I am too nervous that I am going to fall off the thing – I prefer to just walk in the future I think.'*

In regard to escalators, Lily stated: *'I make myself "do escalators" even though I don't like using them. I fell up an escalator once...blood everywhere and I had to get stitches in my leg. It's 'cause I couldn't tell that I was at the top.'*

Evie's statement concurred with Lily's experiences: '*Oh they are tricky...getting on and off them is the bit I hate. My reflexes are not as good as they used to be. You suddenly come to the end and you are tipped off it without warning - like a conveyor belt. So I avoid them.'*

As illustrated in figure 4.25, Katie highlighted that she and Bruno struggled to use escalators: *'I can't use escalators 'cause I can't take the dog onto an escalator unless I carry him. I have to avoid the escalators and that can be difficult sometimes'.*

In response to Way-finder's Question: *Am I at the end of the moving walkway/escalator?* a lack of instructional communication impacted on experience of Using Escalators & Moving Walkways. Experience highlighted that timing of instructional communication was key to enable preparations to exit the moving walkway/escalator to be made. Katie's experience of not being able to use escalators raises awareness of the importance of providing an alternative means to negotiate a change in level [e.g. stairs]. Appropriate identification and navigation communication should support the finding of this alternative.

Figure 4.25: Katie's Experience of Escalators

[N/S.T.6] Avoiding and Dealing with Hazards

A range of Way-finding Hot-spots emerged because of Hazards which Participants experienced in relation to*:* [N/S.T.6.1] Floor, [N/S.T.6.2] Walls, [N/S.T.6.3] Lighting, and [N/S.T.6.4] Other People.

[N/S.T.6.1] Avoiding and Dealing with Hazards: Floor

Temporary or sporadically placed objects on the floor created Way-finding Hot-spots which Participants were not able to pre-empt and prepare for.

Alfie stated: *'Things suddenly appear on the floor and I only know they are there when I either bump into them or fall over them...like cones from people who have washed floors [...]'.*

Adam and James' experiences of tripping and falling over temporarily placed objects echoed Alfie's concerns regarding availability of identification and warning communication prior to an accident. James explained: '*random things placed all over the place are hazardous for a blind person... unless of course I have a clue that they are there.'*

Lily's experiences supported others and she stated '*I suppose I hurt myself most days'.*

Evie explained: *'I trip and fall over quite a lot when things are placed on the floor and I don't know they are there. Once I walked straight into, tripped and fell over a door fixture on the floor. I was so embarrassed cause my bag fell and all the stuff scattered all over the place. I couldn't see to get it all together again.'*

Jack and Evie described problems they had when way-finding through exhibitions which are placed on the floor. Jack explained: *'Way-finding can be a nightmare for me through temporary exhibitions or when things are on the floor when they aren't normally there. I*

have had a few accidents from driving into things. When you are not used to it being there then it's a nightmare.'

Evie recounted a past experience of a similar Way-finding Hot-spot: *'someone had arranged all of these little pots as part of an art work exhibition. I was going along and scanning with my cane. I could smell a fantastic smell of honey and it was an exhibition made out of wax and honey and it was dripping on the floor. Then of course I come along with my swiping cane and messed it all up. The scanning cane smeared the wax and honey everywhere. I'm sure the event organisers weren't happy with me. My friend was told to keep a hold of me because they didn't want me messing up the rest of the exhibitions.'*

During the Way-finding Journey, several Way-finding Hot-spots were experienced due to temporary or sporadically placed objects which interrupted Participants' routes.

Katie experienced a Way-finding Hot-spot when she bumped into a sculptural piece which was placed within a wide corridor. Up until that point she wasn't aware of walking through an exhibition because Bruno (guide-dog) had been weaving her through the exhibition.

James experienced Way-finding Hot-spots when on several occasions he collided with rubbish bins and information stands which were randomly placed at the bottom of stairs in the case study building.

A temporary change in floor surface was also raised as presenting a Way-finding Hot-spot Katie explained: *'when floors become slippy 'cause someone has washed them – there is no way for me to know to be careful –I can't see the cones- and because of this I will slip.'*

These statements evidenced the impact of floor hazards. Way-finder's Questions: *Are there any floor hazards? Where are they? Are they temporary or permanent?* highlighted a need for a form of identification and warning communication prior to encountering a floor hazard. In

echoing analysis of Task Component [A.T.2.2] Avoiding and Dealing with Approach Hazards, distinction between temporary and permanently placed objects was also raised as being beneficial.

[N/S.T.6.2] Avoiding and Dealing with Hazards: Walls

Accidents caused by objects placed on walls were raised as Way-finding Hot-spots, especially when Participants' used the wall as a shoreline (Nadel, 1999) to guide their way-finding.

Lily's strategy of trying to pre-empt hazards on walls was to use her hand to guide her. She explained: '*I hold out my hand to sense if there is something that I am about to walk into'.*

Katie also used this strategy and explained that wall finishes which create *'rough walls*' have resulted in her cutting her hands: '*I like to put my hand out - just for protection- I like to feel all the things which are out with Bruno's detection...like all the things near my head. This means I sometimes get scratches or cuts on my hands...but better that than a bashed head.'*

She added: *'I've been injured by fire hydrants and shelves and* things which *are sticking out and can hit you in the face...all those wee things that are on walls which aren't marked or placed in proper areas.'*

Way-finder's Questions: *Are there any wall hazards? Where are they? What are they? Are they temporary or permanent?* highlighted a lack of communication to enable Participants to gain prior knowledge of wall hazards before having an accident. Appropriate forms of warning and identification communications relating to types of objects [fire extinguishers, signs etc] and location of objects [head height, knee height, wall mounted, ceiling mounted etc.] were highlighted as missing as Participants' undertook Avoiding and Dealing with Hazards: Walls. Again, distinction between temporary and permanently placed objects was also raised as being beneficial.

[N/S.T.6.3] Avoiding and Dealing with Hazards: Lighting

Way-finding Hotspots relating to lighting conditions [artificial and natural] were raised by Participants who were particularly sensitive to a change in lighting conditions.

Evie explained that when she comes into a building she has to give her eyes time to adjust to the different light. She stated, *'whether it is from light to dark or dark to light I need a bit of time to let my eyes see again'.* She identified that this was the first thing she had to do before *'figuring out where she is going to go'.* She said that where possible she tended to go to darker areas of buildings and explained, *'it means my eyes can see'.*

Evie explained the consequence of '*an incredibly bright light' is that her 'eyes can't cope' and that it is a state termed 'bleaching out' which she described as 'more than dazzling'*.

She added: *'[...] there are so many types of "light" and my eyes just can't cope with sudden changes. It is really painful and it takes a long time for my eyesight to recover to normal again. It takes away whatever tiny bit of vision I had.'*

During the Way-finding Journey, Evie experienced a particular problem when using the lift because of a floor mounted spot-light which caused a *'dazzling glare'*. She described: '*a burst of light took away my sight completely. All I could see were the blobs of white light and it took ages for my sight to get back to normal'.* When exiting the lift, Evie took a couple of seconds and stood still with her eyes shut before starting to walk again.

Adam's experience revealed further information regarding light: *'It's the change, the difference between light levels in a building that is quite bad. When you walk into a stairwell and natural light reflects off a surface […] it can be dazzling…particularly with my condition because I don't have any iris. My levelling of light in-take isn't good or quick. Because I don't have any iris my eye has to do a contraction of the pupil as opposed to the iris.'*

He continued: *'It takes ages for my sight to get back to normal, however on the other hand - when I walk into a really dim place it takes me even longer, with bright light I can adjust quite quickly, with dimmer light it is harder and takes longer to adjust.'*

During the Way-finding Journey and as a consequence of reflections and glare caused by lighting, Adam experienced a Way-finding Hot-spot when he walked into a wall. He explained: *'There was loads of glare and reflections so to me it didn't look like there was a wall there. So I walked into it thinking that it was just a corridor.'*

These experiences raised awareness of how design of different types of light affects people with different types of visual loss. Communications to indicate and warn of light changes were raised as being beneficial to enable way-finders to prepare to enter a space with a specific type of light. Evie stated: *'Sometimes if I know I'm about to go into a really bright room I will close my eyes completely and this way I can protect myself.'*

[N/S.T.6.4] Avoiding and Dealing with Hazards: Other People

Other people and *'groups of people standing around, talking and moving'* [Jack & Dave] was an issue raised as the cause of Way-finding Hot-spots. Jack stated: '*I sometimes have to tell people to move because they create barriers like walls and trying to get through them is a nightmare.'* He explained, *'I can only see them if they are straight ahead and it's a disaster if I can't safely get round them.'*

He highlighted that he has difficulties in moving past people without *'crashing'* into them. He explained: *'Before you* [a sighted person] *would turn, you would have that visual awareness there to see someone, but I don't, so I have more chance of hitting someone or bumping into them as I am driving.'*

Jack identified that because he is concentrating on operating his wheelchair he is not always able to recognise that other people are there. He stated, *'people walk all over the place and walk across me as they are looking in shop windows or darting in and out of the crowds.'*

In following-up this point, Jack's assistant explained: *'He* [Jack] *can turn left or right and not notice that someone was maybe in the way. There is sometimes a crash.'*

Jack added, *'I am quite a dangerous wheelchair driver I suppose. I stop, but I have no kind of "stoppage signal", I don't slow down and stop like you might if you are walking […] I am either stopped or moving. People have walked into the back of me because I have gone from moving along to being completely at a stop in a second'.*

Experiences regarding [N/S.T.6.4] Avoiding and Dealing with Hazards: Other People, highlighted the Way-finder's Question: *What do I do?*

In addition to highlighting an instructional requirement this issue raised awareness of a more social issue in relation to a lack of human interaction and understanding the needs of others.

[N/S.T.7] Collecting Information to Way-Find By

Participants identified an essential task carried out during their Way-finding Journeys to be [N/S.T.7] Collecting Information to Way-Find By. The sub-tasks of this overarching task included: [N/S.T.7.1] Using Landmarks, [N/S.T.7.2] Using Visual Signage, [N/S.T.7.3] Using Tactile Cues; and [N/S.T.7.4] Relying On Others: Overcoming Social Awkwardness.

[N/S.T.7.1] Using Landmarks

Utilising landmarks was recognised as a strategy used by Participants to assist themselves in orientating and navigating through a Way-finding Journey. Landmarks included built form objects, and could be based upon visual, physical and sensory elements. Participants with

less visual ability mostly used immediate landmarks whilst those with more visual ability used distant landmarks.

Landmarks were defined by Adam as: *'the things that stick out and contrast from the rest of the surroundings. They sometimes don't look like they specifically belong there, and they are not camouflaged into the rest of the room'.* He explained, *'They get me through a building and make me remember bits...I make a map of it all in my head'.*

Katie explained how she utilised immediate landmarks to way-find: *'smells in a cafe...they are great markers that I can get a cup of coffee. Toilets are easy 'cause I can smell bleach. I also use things like desks as little reference points [...]. Changes of surfaces […] widths of corridors...I can sense that. I count doors that I pass and also sometimes count the number of times I have turned left along corridors. If spaces are big or there are lots of open spaces I will use that too. That's the way I am able to know where I am.'* She added, '*These are the easy little signs that I can actually use'.*

Lily described how immediate landmarks assisted her way-finding: *'I really pay attention to where I am in a building. Right from arriving I will count everything…like doors and stairs. It's my "way-finding thing". I am constantly taking in information. I collect things as I go.'*

Using immediate landmarks was a strategy Emma and James utilised whilst way-finding, [Emma termed this to be *'route learning'*]. As illustrated in figure 4.26, Emma explained: *'I learn, count, and remember all the landmarks on the way through a building to get them again on the way out.'*

Figure 4.26: Emma's Strategy of Using Immediate Landmarks

Colour was also found to be a dominant feature which Participants' used as a landmark to way-find by. Evie explained that red was the only colour that she could see while Katie stated that it was the last colour she ever saw.

Evie explained an instance when colour assisted her way-finding: '*I was in an art gallery once and was able to follow wee red stickers which took me from the street, into the building and up to the reception. It was great – I didn't need anyone to show me the way.'*

Similarly, Lily stated: *Colour is the thing that would allow me to independently be able to find my way. [...] colour for me is amazing. Some hospitals are great because they colour code each floor and you just follow different coloured lines. I have seen others that have arrows on the floor - but they aren't clear enough really. I found that really easy to read and it was really obvious - you just followed the lines- really like following the "yellow brick road" sort of thing. It is the easiest system I have come across.'*

As well as using landmarks to way-find through a building and when speaking about previous experiences, Evie and Grace identified that they used landmarks to provide reassurance that they have reached their destinations.

Grace explained: *'When I am going to this department I always know that I am going to the right place because I always know that the cabinets are on the right hand side are orange. I just look for those orange cabinets.'* She added: *'I also use the stairs as "places that will always be there" and I tend to find myself counting how many floors I go up'.*

During the Way-finding Journey, Participants' spoke of a distinct lack of landmarks being available for them to use, with Evie suggesting: *'if there were more deliberate landmarks then someone like me would have found it easier'.*

In relation to a lack of obvious landmarks, Ben highlighted that landmark definition could be improvised. He described how he had employed this strategy during the Way-finding Journey: *'It all looked the same, nothing stood out. Every corridor I walked down was the same as the one before. Although I am a bit embarrassed to admit it...I started to use good looking girls who were standing about as cues that "Oh I've been here before".'*

In addition to using immediate landmarks, Grace and Ben both identified that they used *distant landmarks* to locate and orientate themselves within a Way-finding Journey.

As illustrated in figure 4.27, Grace explained: *'I'd be standing at the bottom of the stairs and will look up and see a window and I'll think "I know I am the right location if I get to the top of these stairs and I look out through the window and see the bridge". Even if I am going in the right way I will always use it as a marking point. I will use these little personal clues to know where I am.'*

Ben suggested that using landmarks to way-find in the external environment was easier, as, *'it's harder to get a landmark that is visible from everywhere in a building'.*

These testimonies highlighted how important landmarks [immediate and distant] were in providing way-finders with *'little signs'* [Katie] which enabled them to way-find around buildings. Whether visual [i.e. red doors, bridges etc.] or sensorial [i.e. smells from cafes], landmarks provided Participants' with methods to become familiar with their surroundings. In answering Way-finder's Question: *Can I use these landmarks as way-finding cues?* landmarks have been highlighted as being used as both an orientation and navigation device as well as a method of identifying the nature/function of the space [e.g. this is a café].

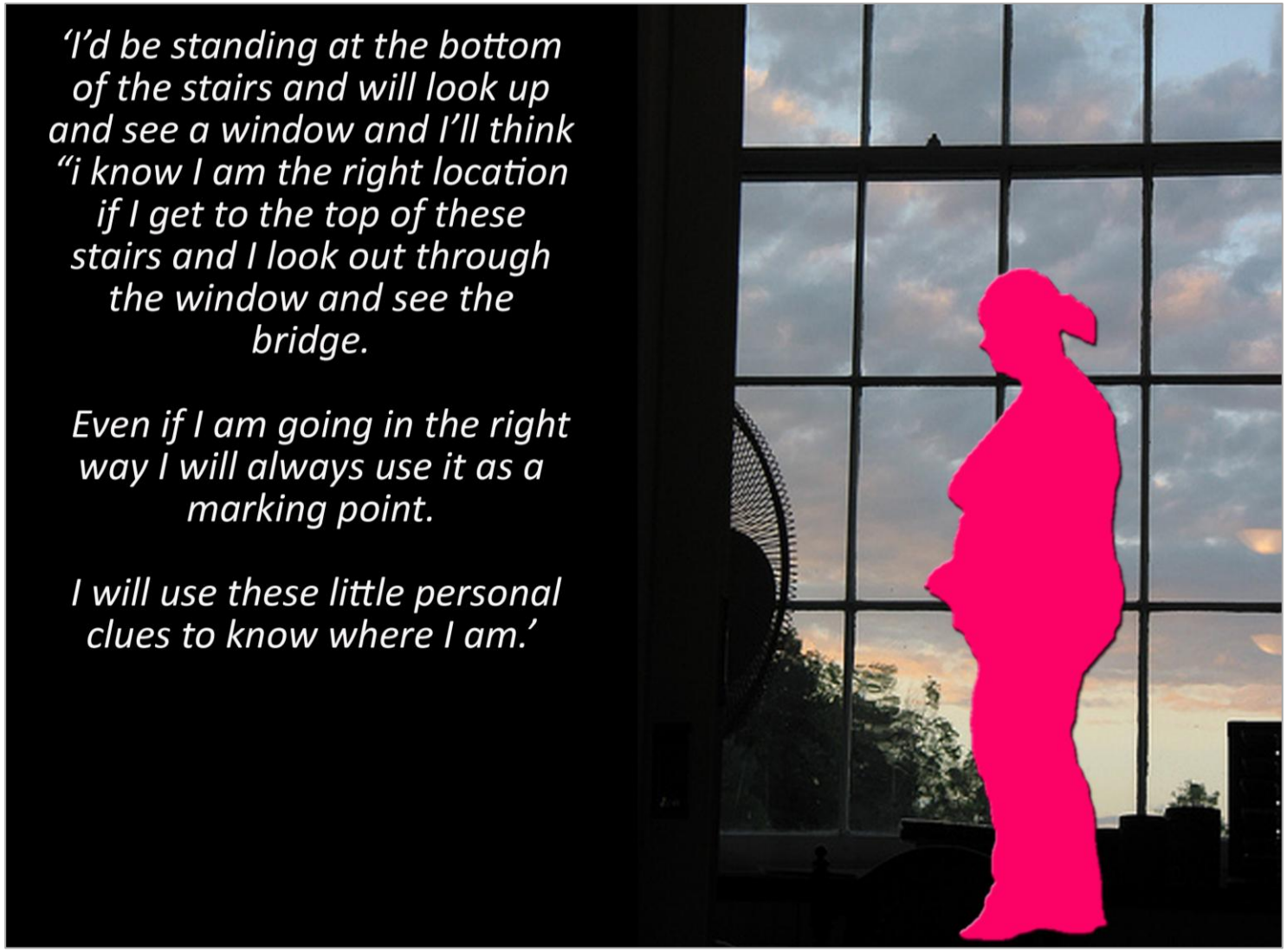


Figure 4.27: Grace's Strategy of Using Distant Landmarks

[N/S.T.7.2] Using Visual Signage

Participants' ability in regard to [N/S.T.7.2] Using Visual Signage was dependent on their visual ability. There were three different types of visual signage user: those who used signage [Grace, Ben and Jack]; those who sometimes used signage [Lily, Emma and Adam]; and those who never used signage [Alfie, James, Katie and Evie].

Those who used Signage

[Grace, Ben and Jack]

Grace explained: *'The best thing I find is signage.'* When way-finding, Grace likened the task of using signage to that of a *'Google Search.'* She explained: *'it's helpful if the signage goes from the generals to the specifics, like departments through to "this person's office". This way I can narrow down the search'.* She added: *'The downside of signage is that walls are covered with signage and you can't see anything. The signage never matches or links areas'.*

Those who sometimes used Signage

[Lily, Emma and Adam]

Adam described problems encountered when using temporary signage: *'half the time they are covering things that you need to see and they never match in with the other signs...they are always printed out on a white page and the text is really small. I don't trust them. They don't have all the information you need…information like that is not clear at all.'*

Adam's experiences during the Way-finding Journey expanded upon the potential problems associated with signage: *'All the signage was in different colours...some were purple, some were blue. It was really hard to see the text because there was never any colour contrast. There was one sign which was brown letters on a brown back-ground – Not helpful at all...I had no idea what it said. There was a "sea" of white paper everywhere and none of the signs were broken down like "this is where you go to get to this department" through to "this is this persons office"...the signs were just all mixed up. An overload of sign mess!'*

Adam described the impact of not being able to use signage during the Way-finding Journey: *'I missed out on lots of information because I couldn't use the signs to link areas together.'*

Adam also identified weakness in orientation and navigation communication available within the *'middle'* part of a *Way-finding Journey* and within stairwells. He stated: *'the place where you need the most information is the middle. There is never any available. It would be incredibly easier if there were directions on each floor near the stairwell. Not just ones for people who can see.'*

He added: *'It would provide an introduction to each area. Maybe there is that type of thing there – it seems obvious that there should be - but I couldn't see it. There are numbers, but what does a number mean if you can't associate that number with anything else?'*

He explained*: 'I could see all these different signs...but none of them helped 'cause I couldn't see what they were trying to tell me. The text is hard to see and read and I waste lots of time trying. All forms of communication regarding way-finding are usually difficult to retrieve and understand when you cannot see where it is or what it says.'*

Emma's and Jack's statements expanded upon this *Way-finding Hot-spot* of missing *middle* communications. Emma explained: *'If there was better signage which was all the way through it would help. I was led deep into the building but then there was no help. There was a "No Smoking" sign written in large letters but nothing to help me find my way about.'*

Emma added: *'Walls full of information are confusing [...] There was too much information and no separation between the different ads – "flat for two" and the "direction pointing stuff".* She added: *'it's difficult to find what you are looking for. Signage should stand out - larger text, colour, and shapes...Throughout the building if all the signs were the same colour you would assume they connected together the places you wanted to find.'*

Lily explained that she would find it useful if signage supported her residual vision and stated: *'I can see something and wee bits and pieces so it would be great if someone could*

design stuff to help people make the most out of the sight I do have. Like make signs more understandable...bigger text maybe with less writing on them would be a start.' She added: *'I find it all quite distressing sometimes, there is always too much signage and I can't get close enough to see what it says.'*

The positioning of signage was also highlighted by Lily as a Way-finding Hotspot, as illustrated in figure 4.28 she explained: '*Signage is only useful to me if it is at eye level. I will have to get as close as possible but I am always aware that other people need to see past me. This makes me uncomfortable. They usually put them either too low or too high and I can't actually get up close to the signage and that is a huge problem.'*

Those who never used Signage

[Alfie, James, Katie and Evie]

Katie echoed Lily's thoughts, stating: *'Wouldn't it be great if there were "signs" for me - like a non-visual sign...not Braille or things like that?' S*he explained: *'the barriers for me are that all the signage is for people who can see. So you have got to equal it up at bit. Add to those visual indicators with something else. If you don't, then how I am I supposed to get around?'*

She added, *'There doesn't seem to be very much out there in terms of "finding the way stuff" that would be helpful for blind people. It is simply a blank canvas.'*

Alfie, Katie, Evie each stated that signage would only be useful to them if they were being guided by a sighted person who needed them.

Signage was used by Participants, specifically visually able Participants, as form of identification, orientation, navigation, instruction and warning communication. Way-finder's Questions became: *Can I use these signs as way-finding cues*?

'Signage is only useful to me if it is at eye level. I will have to get as close as possible but I am always aware that other people need to see past me. This makes me uncomfortable.

They usually put them either too low or too high and I can't actually get up close to the signage and that is a huge problem.'

Figure 4.28: Lily's' Experience of Using Signage

Experiences of [N/S.T.7.2] Using Visual Signage also highlighted several weaknesses which include:

- A lack of signage used as a continuous 'thread' throughout a Way-finding Journey [Start to Destination]
- Missing communications available within the middle of a Way-finding Journey.
- A lack of communication available in stairwells 1] as a source providing a 'welcome to this floor' and 2] to support way-finding on each new level encountered.
- Signage Overload
- 'Littered' walls which are full of different types of miscellaneous information
- Conflicting communications: signage not relating to the context of the surroundings
- Ambiguous information not relating to way-finding communications
- Signage flaws, missing information and information not being up-dated
- A lack of linking signage using themes, colours, formats etc.
- A lack of appropriate forms of *non-visual* or *less visual* communications
- A lack of consistent signage [same size, same format, same locations etc.]
- Unreliable signage
- Poorly located signage
- Signage being covered-up by other signs, posters and miscellaneous information
- A lack of clarity in signage and *'An overload of sign mess!'* [Adam]

[N/S.T.7.3] Using Tactile Cues: Touch Communications

Participants' experiences and statements revealed the importance of tactile forms of communication. In particular they identified the strengths and weakness of: Braille Signage, Tactile Maps and, Tactile Interventions.

Using Tactile Cues: Braille Signage

As outlined in the summary of Participant Profiles, not all Participants in this study could read Braille. James, who could read Braille, stated that although it is helpful for room identification [when he has paused or stopped moving], it was not an aid he could use when orientating and navigating around a building. He outlined weaknesses he had experienced when encountering Braille signage in a building:

- Location and Position: *'you need to know where the Braille Sign is for a start. I can't see it to know it's there. Unless the Braille is on every door at a particular height, in the same position every time, then I can't see to know it is there. I won't go about feeling every door and wall to find if there is Braille.'*
- Message and Meaning*: 'It has to be clear about its purpose and actually read correctly with proper Braille letters and spelling.'* He added: *'There are often spelling mistakes and numbers placed where letters should be.'*
- Format and Design: *'Braille on a really flat surface isn't great - it is actually really hard to read Braille on a really flat wall or a door. It's not really natural to read Braille on a vertical surface – yet in a building Braille is always on a vertical surface.'*

Lily, [who could not read Braille] raised an additional point: *'they* [Architects] *seem to think that as long as there is Braille on a sign then they have covered visual impairment–ticked that box - and they don't really need to make any other effort. But what am I supposed to do?'*

Using Tactile Cues: Tactile Maps

James was the only Participant who had previous experience of using tactile maps. He stated: *'I think they are useful for providing a general idea about a building or a place.'* He

also highlighted three weaknesses when relying on Tactile Maps as an aid: 1. *'You can't read them when walking about as sighted people do with maps',* 2. They are not available in all public buildings, 3. There is a lack of standardisation: '*each time you get one there is a new key that says "this surface indicates this" – you are starting from scratch - who could be bothered?*'

James' experiences indicated that the non-standardisation of tactile maps impacted negatively on it being a useful aid. His testimony contributes to findings by Bernsen (1996) who state that individual way-finding needs are not fully meet by current tactile maps.

Using Tactile Cues: Tactile Interventions

Katie stressed: *'surface contrasts are so […] important to me…they are really quite helpful to mark out places.'* She added*, 'I know that they are marking something...but what are they marking? You never know until you cautiously walk on and find out.'*

In response to *'a real lack of tactile indication'* experienced during the Way-finding Journey Katie stated: *'The question should become "how do you guide people around through with different surfaces?"'*

Evie's experience highlighted issues of confusion arising from tactile surfaces that were not acting as communication devices, [yet could be mistaken as way-finding aids]: '*There were different textures under my feet, but they were not used to signal anything…I think they were just for decoration. That's a shame 'cause I was thinking they were marking something.'*

James and Adam also highlighted weaknesses in tactile aids. James explained: *'These things are dangerous if they don't indicate something, there is nothing worse than walking along and finding one of these textured things, and thinking "right, I wonder what it is indicating?" I wonder if it is meant to be indicating something – "should I be careful?" It needs to be clear*

with what they supposed to be saying. Is it indicating something, or is it just ornamentation? There are no standards and that is really problematic.' Adam stated: *'I wouldn't say that tactile surfaces help me at all [...]. They don't have a set standard. No one understands what they mean.'*

These experiences indicated that the non-standardisation of tactile interventions weakened them as being a useful aid. Participants' testimonies highlighted a missed opportunity, the Way-finder's Question: *Can I use these textures as way-finding cues?* indicates that textures could be utilised to provide a range of way-finding communications.

[N/S.T.7.4] Using Audio Cues: Hearing Communications

In addition to Spatial Audio cues which have been explored at various points throughout this discussion [such as N/S.T.1.3 Finding and Following a Route Through: Volume], experiences of using Audio Cues such as announcements made over loud speaker systems were also raised by Lily, Alfie and Jack as having detrimental impact on their Way-finding Journeys.

Lily identified that forms of audio communication can often disrupt her focus: *'I block everything out - all the audio, all the people...and I concentrate. For me audio isn't very useful really. Someone would have to […] tap me on the shoulder to get my attention.'* She explained that she only found audio helpful in specific situations, such as departure announcements in a train station. *'For audio announcements to work I have to be waiting for them […] they just make it hard for me to concentrate on what's going on.'*

Alfie stated: *'Those noisy announcements drive me mad...they are all muffled and I can't hear them. If my wife is chattering away to me I can't hear anything. You have to be really paying attention. I get a bit nervous because they might be saying something important.'*

Jack also highlighted negative experiences of *'voice activated systems'*: *'They are so loud and really annoying. A lot of the meaning is on how people pronounce words, and that is always lost when voice activated systems are speaking at you.'*

These experiences of using *Audio Cues,* demonstrated as a Way-finder's Question: *Can I use these audio announcements as way-finding cues?* indicates a missing opportunity to appropriately use audio for cues of different types of way-finding communication.

[N/S.T.7.5] Relying On Others

Awkwardness in relation to interactions between sighted people and people with visual loss was raised by Participants' as a significant Way-finding Hot-spot. In relying on others for assistance with Way-finding Journeys there were two contrasting types of experiences: Over-Compensation [people insisting on helping Participants when no help is needed]; or Avoidance [people ignoring Participants when help is needed and is being asked for].

Evie explained: *'People often try to help when no… or less help is needed. They sometimes insist and just manhandle you.'*

A past experience of Katie's affirmed this Over-Compensation: *'I was on a train and we pulled into the station. Two men had greeted me at the door…they said "Hello we are here to help you". Before I could say anything, one of them took Bruno* [guide dog] *and the other one lifted me onto a trolley. They pushed us to the door, lifted us off and left. For one thing I felt like I was being kidnapped. The other was that they took away all my orientation…I had no idea where I was in relation to where I had come off the train. I didn't know what door I was at. I know they are only trying to help, but people can do more harm than good sometimes.'*

With regards to the opposite extreme – that of Avoidance, Katie stated: *'I have noticed that if I pay for the shopping, they give my husband the change. I think there is something about eye contact or embarrassment [...]. The same thing happens if we are out and I ask someone for directions. They speak to the sighted person.'*

Katie encountered several Way-finding Hotspots because of peoples' avoidance of interacting with her during the Way-finding Journey. People who were walking past her in the corridor ignored her when she asked for help.

As Illustrated in figure 4.29, she described: *'I was trying to ask someone to help me with directions to move to the next wee bit of the building. I could hear people and I could hear their footsteps but when I said "Hello…hello could you help me with directions?" They just seemed to ignore me and walk on past. Then after saying it for the third or fourth time a man came over and tried to help.'*

Lily and Evie both recounted previous experiences of avoidance with Evie stating: '*You get people who think that you can't see them, so they don't offer you help. I think it's because they don't know how to handle you, I find that happens a lot.'*

Participants' experience of [N/S.T.7.5.1] Relying On Others highlighted the impact social interaction with other people can have on Way-finding Journeys. The Way-finder's Question became: *Can I use another person as a provider of way-finding cues?*

Appropriate communications [navigation, orientation, identification, warning and instruction] to support way-finding by people, regardless of visual loss, may mitigate the need to ask for help from other people. However, overcoming social awkwardness is not thought to be an issue resolvable through design of way-finding communications.

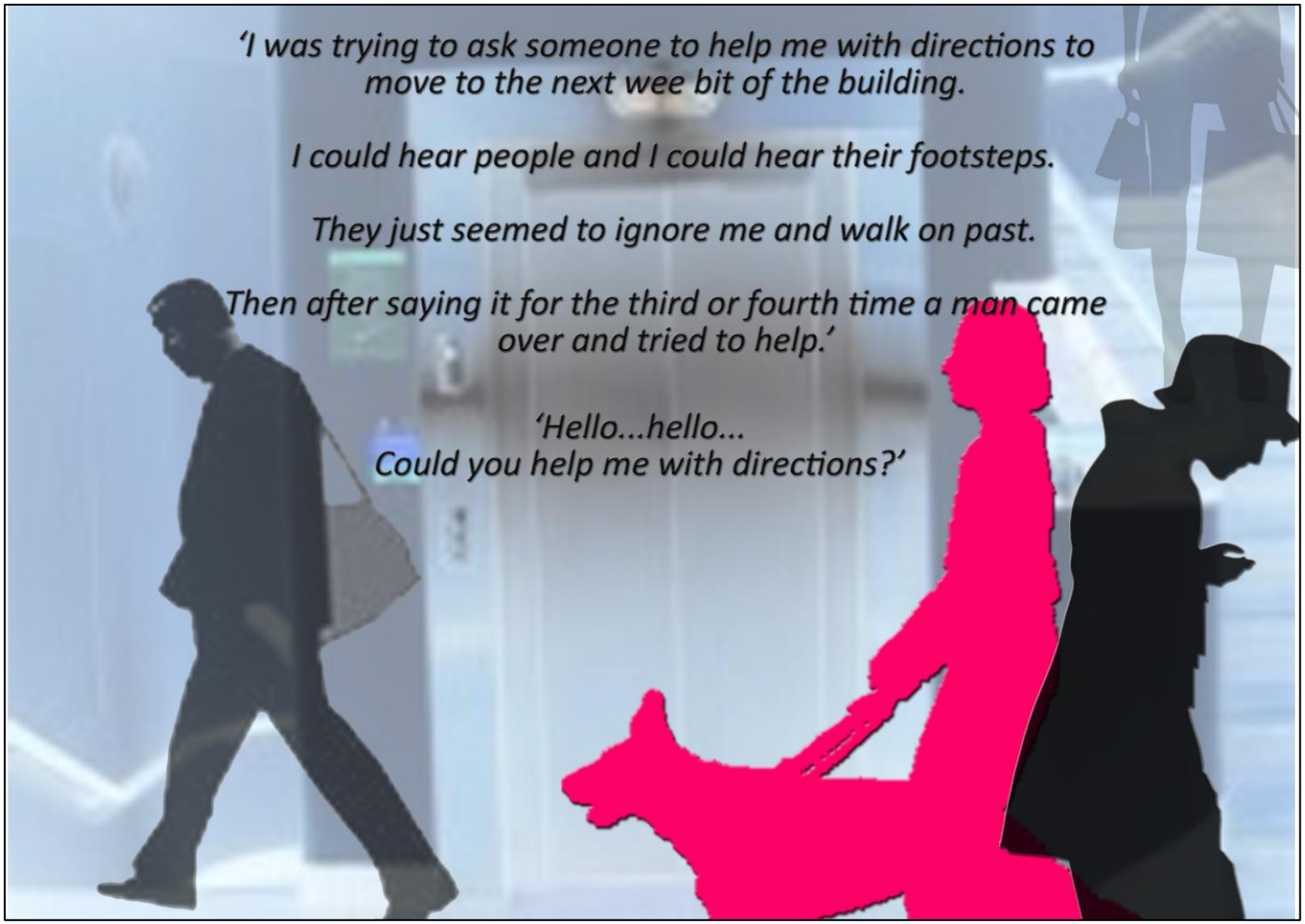


Figure 4.29: Katie's Experience of Relying On Others: Overcoming Social Awkwardness

4.2.5 Journey Stage
Destination

Specific to the final stage of a Way-finding Journey, Journey Stage: Destination encompassed Way-finding Hot-spots which occurred within the locale of the ultimate Destination [i.e. the pre-determined destination sought from the start of the Way-finding Journey].

Completion of the Way-finding Journey was achieved when Participants crossed the threshold and entered the Destination.

Using Table 4.5 as a summarised guide, the Task Components and Communication Requirements evidenced within Journey Stage: Destination is now discussed.

Journey Stage		Way-finding Task Component [Way-finding Hot-spot]	Communication Requirement [Way-finders Question and Communication Need]	
Destination				
	D.T.1	**Finishing a Way-finding Journey**		
	D.T.1.1	**Identify the Destination floor/area/zone**	*Am I near the Destination?*	**Identification**
	D.T.1.2	**Finding the Destination within this floor/area/zone**	*How do I get to the Destination?*	**Navigation**
	D.T.1.3	**Identifying and Stopping at the Destination**	*Is this the Destination?*	**Identification**

Table 4.5: Charting of a Way-finding of Journey: Destination

[D.T.1] Finishing the Journey

[D.T.1.1] Identifying the Destination Floor/area/zone, followed by [D.T.1.2] Finding the Destination within this Floor/area/zone, then [D.T.1.3] Identifying and Stopping at the Destination, were the final sub-tasks of [D.T.1] Finishing a Way-finding Journey. Arthur and Passini's (1992,p. 116) statement that way-finders 'have to recognise destinations', proved apt in the final stages of the Participant's Way-finding Journeys. All three sub-tasks were evidenced by Participant's not being able to firstly identify that they had reached the correct floor, and then secondly, reached the correct destination. In several instances, during the Way-finding Journey, Participants either left the correct floor and/or walked past the destination. Three Participants [Katie, James and Emma] gave-up and did not reach the destination. Katie passed the destination floor once and the destination twice before deciding to stop while James stayed on the destination floor but passed the destination once before deciding to give-up. Emma passed the destination once before deciding to stop the Way-finding Journey on the floor above the Destination. Adam passed the destination twice before arriving and stated, *'It was so annoying [...] I couldn't differentiate between all the offices.'* Grace and Ben passed the destination once before reaching the destination point. Evie was guided by the Security Guard and Jack was helped to the destination by his assistant. Lily was the only Participant who, independently and without passing it, was successful in being able to identify and cross the threshold of the Destination.

Participant's experiences revealed that identification and navigation communications were significant Communication Requirements in assisting Participant's to undertake [D.T.1] Finishing a Way-finding Journey. It was also highlighted that it would also be helpful if the accommodation on each floor level was clearly identifiable at the arrival point on each floor.

4.3 Chapter Summary

This Chapter has documented the analysis and discussion of findings evidenced from user-centred data uncovered from the three phases of a Way-Finding Scenario.

Profiles of the ten Participants who undertook the Way-finding Scenario have been summarised. The *Charting of a Way-finding Journey* has been illustrated and discussed.

A prototypical Way-finding Journey, based on user-centred data has been illustrated. The Way-finding Journey has been described through the lens of five Journey Stages - Approach, Entrance, En-Route Destination, Destination and Non-Specific. These Journey Stages emerged through an iterative analysis and structured discussion of the research findings.

Within each Journey Stage the positive and negative events experienced by Participants, defined as Way-finding Hot-spots, have been analysed as a hierarchy of Task Components.

These Task Components were further analysed in regard to what the way-finder required to be enabled to undertake Task. Five types of Communication Requirements were the result of this analysis. Way-finders need, at different points through their Way-finding Journeys, a series of: Identification, Navigation, Orientation, Warning, and Instruction communication.

The following two Chapters conclude this Thesis. The first, Chapter 5, will form the conclusion to the research findings. As well as succinctly bringing together the full themes and conclusions of this research it will discuss key findings in relation to the research question and the context of the literature. The second, Chapter 6, will be a conclusion of the PhD process. With critical reflection the research contribution, significance and relevance of research findings and limitations of the study are considered before speculative recommendations are made for future research.

Chapter 5 Findings Conclusion

A Way-finding Journey

'[T]he greatest need of those who cannot see is, and always will be, communication on all levels of existence with those who can see.'

Alan Eaton(Roberts, 1998,p. 81)

5.0 Chapter Introduction

Until this point in the Thesis, four Chapters representing core stages in the research have been presented. In Chapter 1 the research was introduced, while in Chapter 2 the literature context of the study was established. In Chapter 3 the research design was framed through formulation of a methodology and set of methods, and in Chapter 4 the findings evidenced by Participant data were analysed, presented and discussed.

Spanning across a broad spectrum of disciplines, previous research studies have focused on various characteristics of human way-finding in relation to the built environment (Arthur and Passini, 1992;Lynch, 1960;Downs and Stea, 1973). However, very little has been found in the literature [Chapter 2] based on findings of real-life experiences of way-finding, undertaken by real-life participants with a range of visual ability within the context of a real-life building.

In recognising this gap in the knowledge a set of Research Questions were formulated:

- What are the design issues revealed by participants who have a range of visual ability as they way-find in a large public building?
- What is an appropriate Methodology and Set of Methods to investigate experiential components of way-finding suited to people with limited visual ability?

To answer these questions the design and utilisation of a methodology, transpiring as Research Principles, and an innovative set of methods, transpiring as a Way-finding Scenario has enabled a new theory in understanding way-finding to emerge. This theory is based on Participants' holistic experiences of their Way-finding Journeys.

This research identifies and highlights issues evidenced by Participants' experiences of way-finding. It did not devise a set of guidelines or prescribe design recommendations, because as Pullin (2009) states: 'Disabled people do not all share a single experience of their impairment [...] likewise, designers do not follow a single approach to design, and each designer will even approach different briefs in different ways'(p. 7). Each person's experience of way-finding, with their visual ability, will be different. Each experience will provide rich insight which is crucial for enhancing understanding of Way-finding Journeys around buildings.

In adopting the Social Model of Disability [when dealing with people] and the Architectural Model of Disability [when dealing with the building/built environment], this study has encouraged this individuality.

The objective of this chapter is to conclude the research by drawing out the major themes evidenced by the findings. As well as highlighting the importance of the findings [discussed in Chapter 4], it will consider and argue their significance in relation to the research questions and contextual literature. It will present the creative and original research contribution: the filling of a gap in the current knowledge.

This Chapter, illustrated in figure 5.0, will present a new Theory of Way-finding.

Section 5.1 establishes foundation concepts of - the theory of A Way-finding Journey.

Section 5.2 presents the research outcome - *The Experiential Charting of a Way-finding Journey.*

Section 5.3 discusses key themes extracted from the constructed 'Image' of a Way-finding Journey.

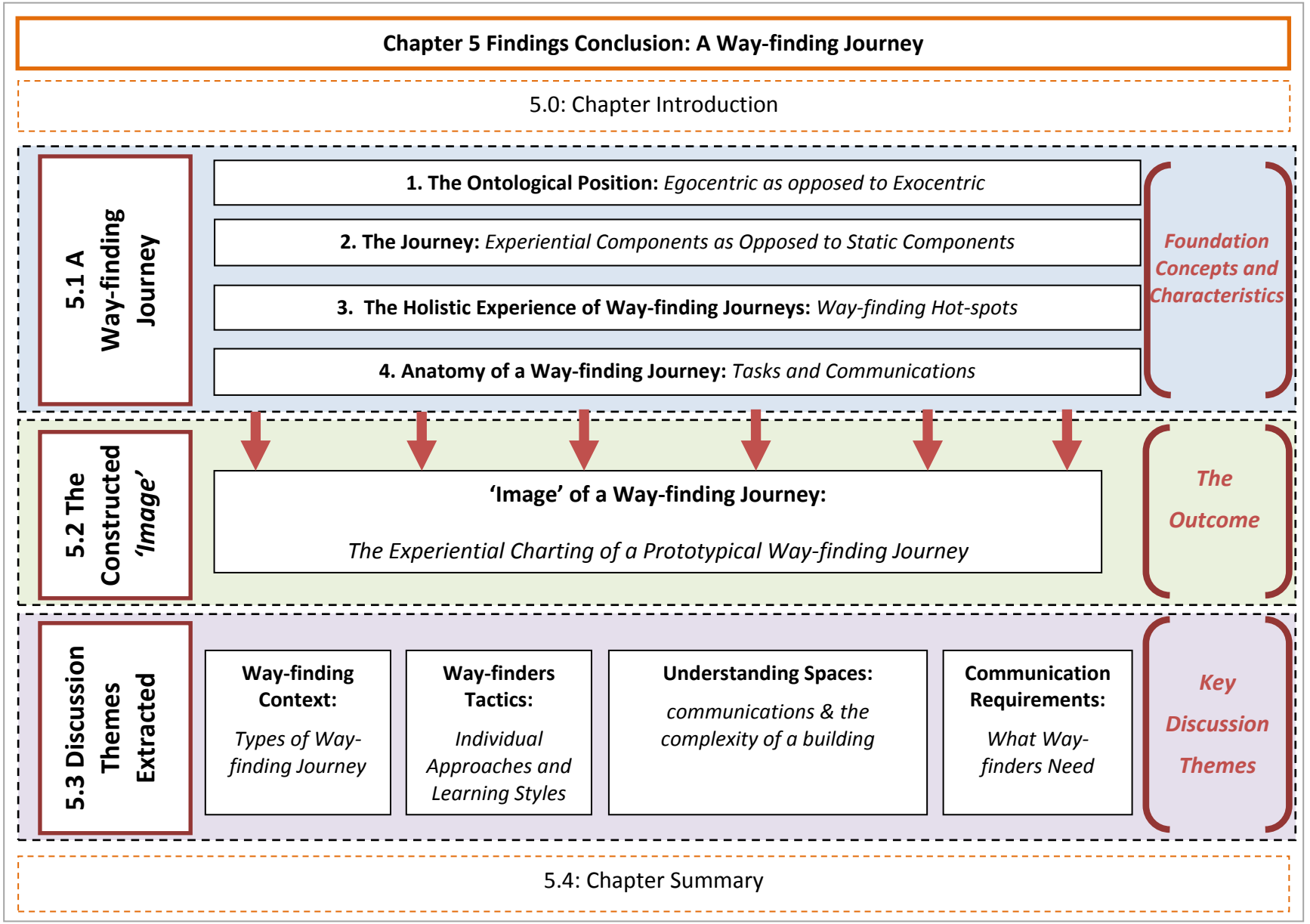


Figure 5.0: Chapter Outline and Stages in describing the new Theory of Way-finding

5.1 A Way-finding Journey: Building the Foundations of the Theory

As illustrated in figure 5.1, the founding concepts of the theory will now be discussed.

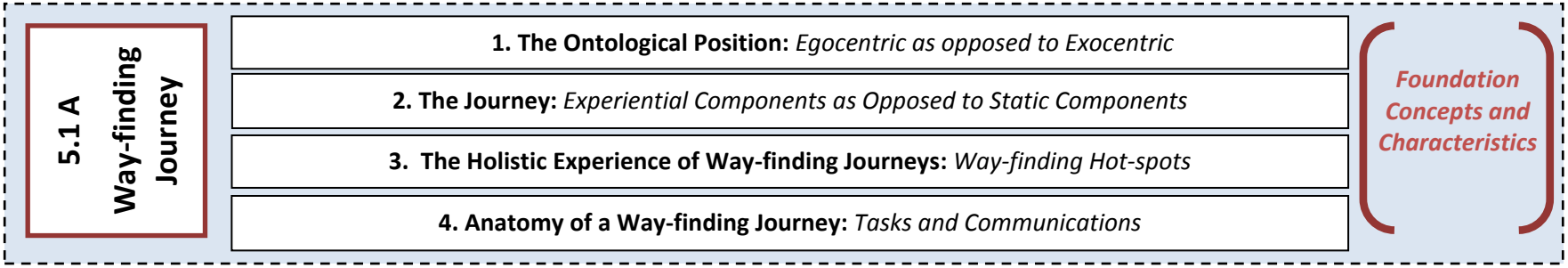


Figure 5.1: Building the Foundations of the Theory: Characteristics of A Way-finding Journey

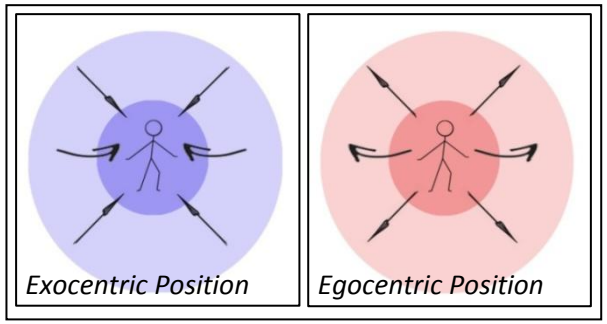


Figure 5.2: Ontological Positions

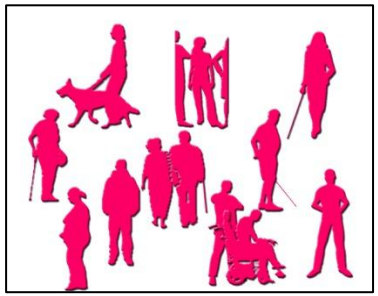


Figure 5.3: User-Centred Participants Generate Data

5.1.1 The Ontological Position: *Egocentric as opposed to Exocentric*

This study was based on the philosophical concept that through reflecting on experiences, understanding is constructed and made sense of (Grix, 2002). It remained grounded within the ontological perspective of constructivism [as opposed to objectivism]. This was one of the Research Principles [which is discussed fully within Chapter 3].

As opposed to an exocentric position, as adopted by (Ching, 1996;Unwin, 2009;Arthur and Passini, 1992), this study has grown from an egocentric position [figure 5.2]. In taking a similar approach to design research groups such as the Helen Hamlyn Centre, Digital Media Access Group, The Interdisciplinary Disability Research Institute, Maketools and global design firms such as IDEO, the Researcher identified the user [figure 5.3] to be a vital source in uncovering knowledge based on experience.

The focus of this study was the user, their visual ability in relation to their experiences of way-finding around a building. In taking an Egocentric position experiential data relating to users' Way-finding Journeys was captured.

Ontological Position Applied to Way-finding:

The Journey

Exocentric Model	**Egocentric Model**
View point of the disembodied analyst [i.e. the Architect]	Viewpoint of the Person's Experience of their Journey [i.e. the Way-finder]
Environment Regardless Model	Environment Encountered Model
Static Building Components [e.g. *Path*]	Experiential Components [e.g. experience of using the *Path*]

Figure 5.4: Comparisons drawn between the Exocentric and Egocentric Positions

5.1.2 The Journey: *Experiential Components as Opposed to Static Components*

In using figure 5.4 as a guide to the differences between the models, the outcome of using the egocentric position as opposed to the exocentric will now be considered.

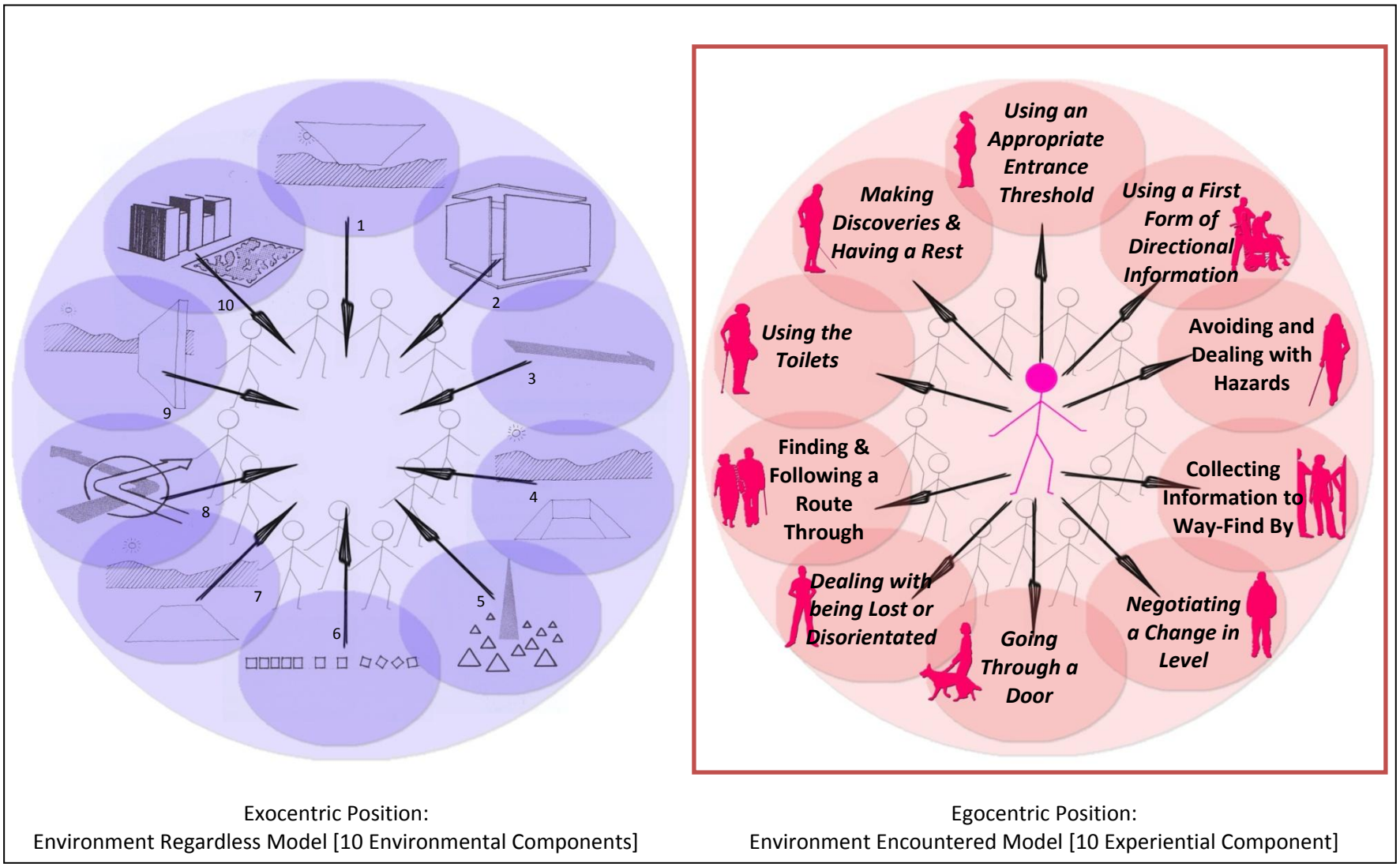
By adopting the egocentric position to investigate way-finding, the focus shifted from the Environment Regardless Model [i.e. abstracted from the building regardless of the person] and became immersed in the Environment Encountered Model [i.e. encountered on the journey by the user]. Previous architectural studies have adopted an exocentric position. This [figure 5.5 blue graphic] has resulted in the disembodied architectural analyst concentrating on the static components of a building [e.g. architectural systems and orders (Ching, 1996), and basic elements of architecture (Unwin, 2009)].

In this study, the users' experience of their Way-finding Journey was the key focus. The environment in this study was encountered and experiential components, illustrated in figure 5.5 [pink graphic] were the result of this. The static components were included within an experiential component if they had been encountered during a Way-finding Journey.

In previous research, *Journeys* have been understood as 'a flow of travel' (Harper and Green, 2000) or as 'user sequences' (Myerson, 2001). This current research uses the fluid concept of a *journey* in relation to way-finding experiences: *The Experiential Charting of a Way-finding Journey.*

This concept of a Way-finding Journey is best depicted by Adam [one of the Participants] who explained: *'It's like a jig-saw... I can't see very well so, for me, way-finding is a task of grabbing all the other information...all the smells and everything I can touch. Then I have to add it all together to be able to way-find through it all'* [illustrated in Chapter 4: figure 4.17].

This study has uncovered the experiential components of a Way-finding Journey.



Exocentric Position:
Environment Regardless Model [10 Environmental Components]

Egocentric Position:
Environment Encountered Model [10 Experiential Component]

Figure 5.5: The Focus: Egocentric Person Experience as opposed to Exocentric Building Analysis

1. Unwin's *Roof or Canopy*, 2. Ching's *Overhead Plane, Base Plane, and Wall Plane*, 3. Lynch's *Paths*, 4. Unwin's *Lower Area or Pit*, 5.Lynch's *Landmarks*, 6. Ching's *Rhythm*, 7. Unwin's *Area of Ground*, 8. Lynch's *Nodes*, 9. Unwin's *Barrier*, 10. Lynch's *Edges*. (Ching, 1996;Unwin, 2009;Lynch, 1960)

5.1.3 The Holistic Experience of Way-finding Journeys: *Way-finding Hot-spots*

'[..]spaces can stimulate the senses and the mind through form, materiality and light or colour. Their dimensions can provide either shelter or security and their design can generate feelings of surprise, astonishment, joy, or well-being' (Exner and Pressel, 2009).

Different from previous way-finding research, this study has not concentrated on negative issues of way-finding (Arthur and Passini, 1992;Baker, 1999;Barker et al., 1995). Instead, the holistic experience was explored [by way of the three Phases of the Way-finding Scenario]. The uncovering of positive and negative encounters have aided in depicting a more complete description of a Way-finding Journey.

The term Way-finding Hot-spot[s] was coined in this study to describe significant happenings encountered by a way-finder on their journey[s]. They were a type of way-finding event, temporal and spatial, positive or negative, which was experienced by the participants [either in their past memories or their present experiences of way-finding].

All Participants in this study, regardless of visual ability, experienced both negative and positive Way-finding Hot-spots [which are of equal importance].

Some negative Way-finding Hot-spots were found to include more than not being able to reach the destination. They were defined as the *'tricky'* [Katie, Jack and Evie] parts of a journey when way-finders have become lost or disorientated, *'frustrated'* [Emma, Adam and Lily] or injured [Katie]. They were the points when the way-finder became distracted or when access to way-finding communications was not possible when trying to establish where to go. Indeed, busy spaces or unpleasant encounters with staff and having to rely on others throughout the journey were highlighted as being negative Way-finding Hot-spots.

Some examples of positive Way-finding Hot-spots were found to be the joyful, easy parts of a journey which were perhaps made by chance or were deliberately sought. They were the times when there was a pause in the journey to chat with a friend met in the hallway or when a piece of artwork was found on the journey. They were the moments taken to look out of a window at the view or the smells used as landmarks of identification. They were the instances when a *'breather'* [Adam] was taken in a sunny spot to calm down or when helpful people were met on the way.

The feelings of achievement, overcoming challenges, the implementation of strategies and, of course, arriving at the destination were also identified as positive Way-finding Hot-spots.

Way-finding Hotspots, Positive and Negative, formed the content of a Way-finding Journey.

This study has uncovered both the positive and negative experiential components of a journey around a building. It has depicted the holistic experience of a Way-finding Journey.

To ensure findings were not context-specific, Way-finding Hot-spots were generalised. They were categorised into a hierarchy of Task Components and Communication Requirements. The following section defines the Anatomy of a Way-finding Journey and describes how Task Components were constructed.

5.1.4 Anatomy of a Way-finding Journey: *Tasks and Communications*

Before discussing how the Way-finding Journey evolved, the following figures illustrate that a Way-finding Journey [Figure 5.6] is composed of three elements, Journey Stages, Task Components and Communication Requirements.

A Way-finding Journey is a fluid, continuous movement within a building. A Way-finding Journey is composed of Journey Stages [figure 5.6].

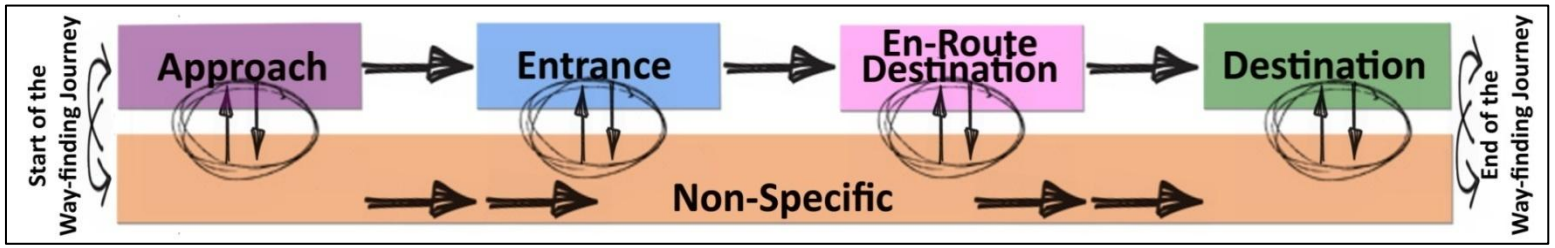


Figure 5.6: Journey Stages

While Ching (1996) and Arthur and Passini (1992) begin to discuss the importance of the *Approach* and *Entrance* to a building, this current study has established further distinctions of a person's Journey Stages: Approach, Entrance, En-Route Destination, Destination and Non-Specific. [A conclusion to each of these Journey Stages can be found in the following section, 5.2 The Constructed 'Image': A Way-finding Journey.]

Each Journey Stage is composed of Task Components. Harper and Green (2000) put forward the idea of *tasks* when building their theory of way-finding. In this study Task Components [figure 5.7] were the 'mini- missions' way-finders undertook at a micro level in order to, at a macro level, complete a Way-finding Journey. They became the '*to do list*' of way-finding. Way-finding Journeys are broken-down into a hierarchy incorporating top level tasks as well as sub-tasks [and sub-sub-tasks].

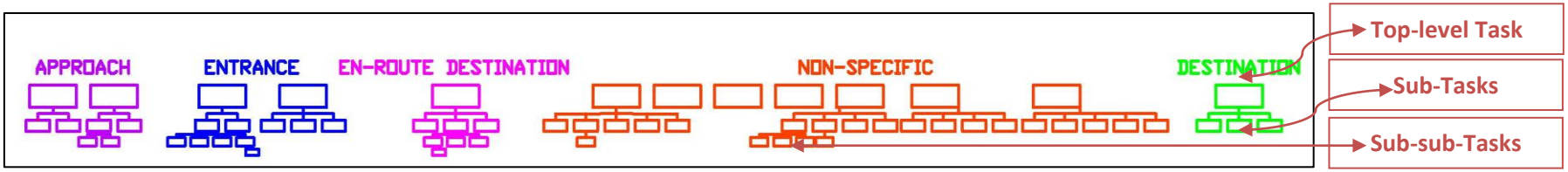


Figure 5.7: Task Components

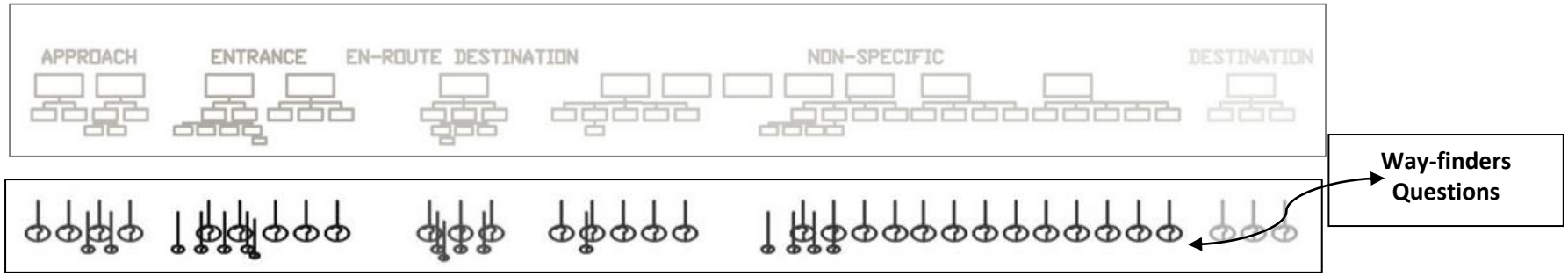
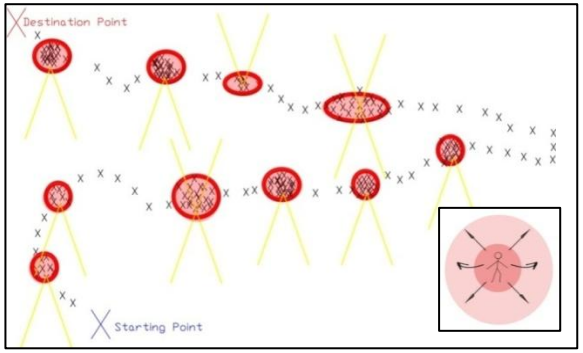


Figure 5.8: Communication Requirements

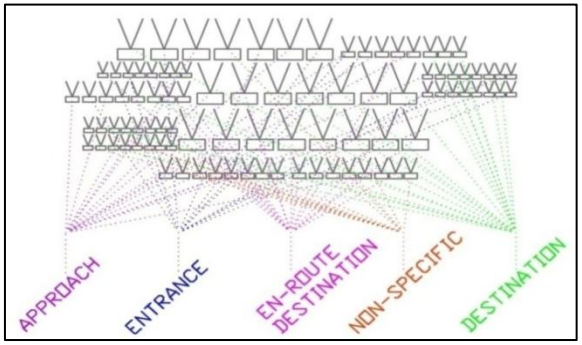
The analysis of Task Components highlighted a Communication Requirement [figure 5.8]. This was posed as a Way-finder's Question. This Question is a summation of the Way-finders need – what they require to way-find a specific Task Component within a specific Journey Stage.

These Task and Communication components begin to establish open-ended design briefs which, although specific to a Requirement, is not a prescript guideline. It is open to disciplinary interpretation [i.e. the brief will be dependent on the skill set of the architect, designer, social scientist]. Not all Way-finders Questions are resolvable by design.

Figure 5.9: The Evolution of the Way-finding Journey



1: Way-finding Journey and Way-finding Hot-spots



2: Journey Stages

The Evolution of the Way-finding Journey

As already established, this Theory of Way-finding is building from people's experiences of their *Way-finding Journeys*. This section will describe the *Evolution of the Way-finding Journey* as illustrated in figure 5.9.

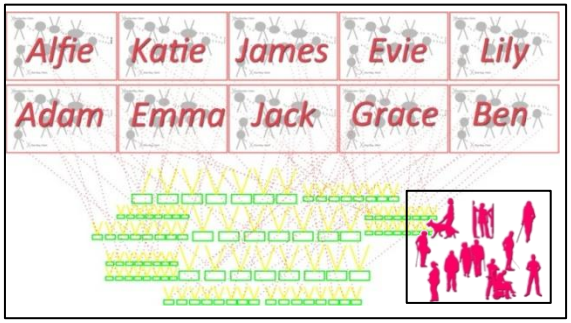
1: Way-finding Journey and Way-finding Hot-spots

The Way-finding Journey is a fluid, continuous movement within a building. Experiential Components categorised as Way-finding Hot-spots were drawn out of the Way-finding Journey. A Way-finding Hot-spot is inclusive of both present experiences of happenings on a journey and also memories, description and narrative of past way-finding experience. For example, a present Way-finding Hot-spot might be: *'I can't find the stairs'*. A past Way-finding Hot-spot might be: *'It's great when I can find a path which leads me straight to the front door'.*

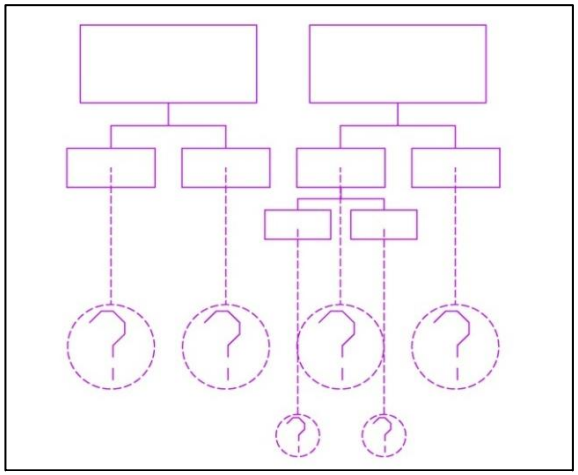
2: Journey Stages

Way-finding Hot-spots occurred within Journey Stages. For example: *'I can't find the stairs'* could have happened at sporadic points throughout a Way-finding Journey depending on how many forms of vertical circulation were encountered. Therefore it became categorised under Journey Stage: Non-Specific. Way-finding Hot-spot: *'It's great when I can find a path which leads me straight to the front door'* was categorised under Journey Stage: Approach as it was specific to the external conditions of a journey.

Each Journey Stage arose iteratively through the process of analysis and together they define *The Experiential Charting of a Way-finding Journey.*



3: Task Components



4: Communication Requirements & Way-finder's Questions

Figure 5.9: The Evolution of the Way-finding Journey

3: Task Components

Information from Way-finding Hot-spots experienced within all ten Way-finding Journeys was aggregated. Collectively these were categorised in relation to Task Components. For example Way-finding Hot-spot: *'I can't find the stairs'* is a negative issue which was categorised under the top-level task of *[N/S.T.5] Negotiating a Change in Level,* under a sub-task of *[N/S.T.5.1] Using Stairs* and under a sub-sub-task of *[N/S.T.5.1.1] Finding and 'Marking Out' the Stairs.*

Way-finding Hot-spot: *'It's great when I can find a path which leads me straight to the front door'* is a positive issue. It was categorised under the top-level task *of [A.T.2] Crossing the Site: Getting to the Point of Entrance*, under a sub-task of *[A.T.2.1] Finding and Following an External Approach Route* and under a sub-sub-task of *[A.T.2.1.2] Accessing a Path.*

4: Communication Requirements

Task Components were analysed in terms of Communication Requirement. These were firstly posed as Way-finder's Questions, for example: *'Where are the Stairs?' or 'How do I get onto that path?'* Secondly a Requirement Type was identified. In both these instances a need for a form of Navigation Communication was highlighted. [Other forms of Communication Requirement included: Identification, Orientation, Warning and Instruction].

Task Components from this study contribute to the way-finding dialogue by identifying the questions asked by way-finders throughout their Way-finding Journeys.

Section 5.2 presents a *The Experiential Charting of a Way-finding Journey* and will discuss the significant and interesting findings.

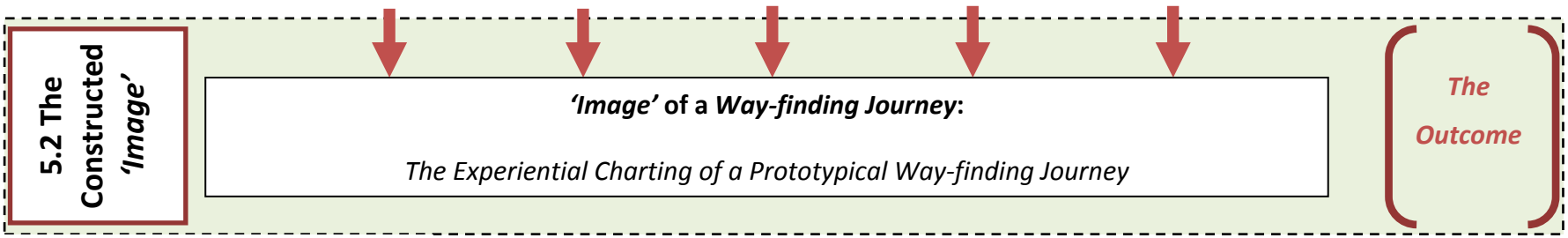
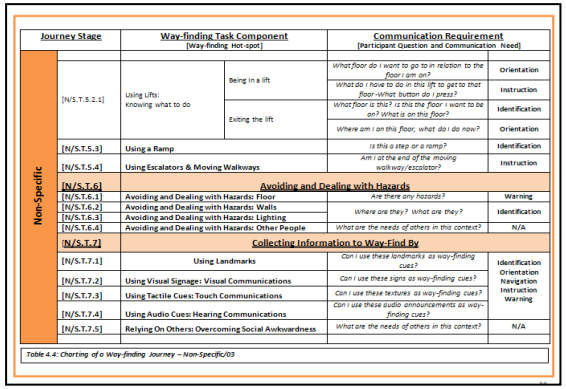


Figure 5.10: The Constructed 'Image'



Journey Stage		Way-finding Task Component [Way-finding Hot-spot]		Communication Requirement [Participant Question and Communication Need]	
Non-Specific	[N/S.T.5.2.1]	Using Lifts: Knowing what to do	Being in a lift	What floor do I want to go to in relation to the floor I am on?	Orientation
				What do I have to do in this lift to get to that floor-What button do I press?	Instruction
			Exiting the lift	What floor is this? Is this the floor I want to be on? What is on this floor?	Identification
				Where am I on this floor, what do I do now?	Orientation
	[N/S.T.5.3]	Using a Ramp		Is this a step or a ramp?	Identification
	[N/S.T.5.4]	Using Escalators & Moving Walkways		Am I at the end of the moving walkway/escalator?	Instruction
	[N/S.T.6]	Avoiding and Dealing with Hazards			
	[N/S.T.6.1]	Avoiding and Dealing with Hazards: Floor		Are there any hazards?	Warning
	[N/S.T.6.2]	Avoiding and Dealing with Hazards: Walls		Where are they? What are they?	Identification
	[N/S.T.6.3]	Avoiding and Dealing with Hazards: Lighting			
	[N/S.T.6.4]	Avoiding and Dealing with Hazards: Other People		What are the needs of others in this context?	N/A
	[N/S.T.7]	Collecting Information to Way-Find By			
	[N/S.T.7.1]	Using Landmarks		Can I use these landmarks as way-finding cues?	Identification Orientation Navigation Instruction Warning
	[N/S.T.7.2]	Using Visual Signage: Visual Communications		Can I use these signs as way-finding cues?	
	[N/S.T.7.3]	Using Tactile Cues: Touch Communications		Can I use these textures as way-finding cues?	
	[N/S.T.7.4]	Using Audio Cues: Hearing Communications		Can I use these audio announcements as way-finding cues?	
	[N/S.T.7.5]	Relying On Others: Overcoming Social Awkwardness		What are the needs of others in this context?	N/A

Table 4.4: Charting of a Way-finding Journey – Non-Specific/03

Figure 5.11: Thumbnail of Analysis Charts - Chapter 4

5.2 The Constructed 'Image': A Way-finding Journey

This section [figure 5.10] presents the research outcome: *The Experiential Charting of a Way-finding Journey*. Each Journey Stage [figure 5.12] is summarised and the fundamental Communication Requirements evidenced by the Task Components are drawn out.

[The full analysis and Charts of each Journey Stage [figure 5.11] can be found in Chapter 4].

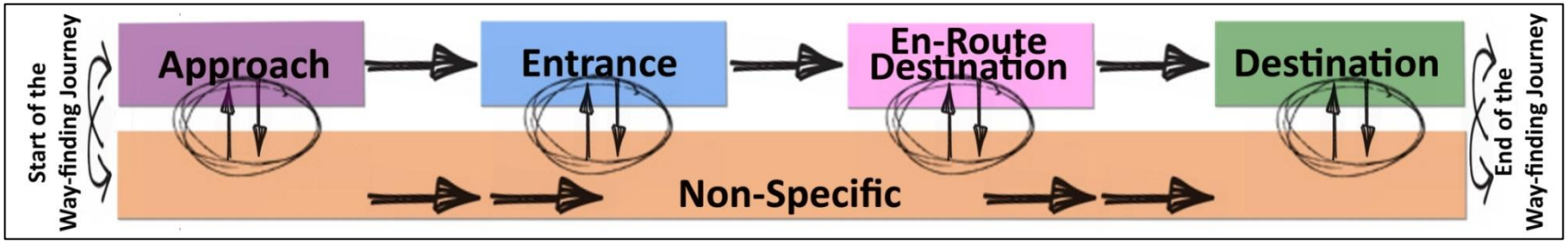


Figure 5.12: The Journey Stages

5.2.1 Journey Stage

Approach

emerged based on external Task Components which occurred between arrival at the site boundary and reaching the building entrance. There were two top-level tasks within Approach: 1. Arrival and Threshold and 2.Crossing the Site: Getting to the Point of Entrance. These tasks, framed [below] as a series of Way-finder's Questions highlight the fundamental Communication Requirements of Journey Stage: Approach.

1. Arrival and Threshold

- *Is this the correct site?*
- *Where should I enter onto the site?*
- *How do I get to that site threshold from here?*

2. Crossing the Site: Getting to the Point of Entrance

- *Where am I compared to the entrance and how do I get there?*
- *Where am I in relation to where I want to be on this approach route?*
- *Can I interact with Multi-use Approach Route users to know what they are going to do?*
- *How do I get onto a pedestrian path?*
- *Are there any hazards on approach? Where are they? Are they temporary or permanent?*

Multi-Use Approach Route is defined in this study as the external land immediately surrounding the building. It is an area used for both pedestrian and vehicle activities [e.g. a car-park, bicycle storage, drop-off and pick-up area, area for taxis and deliveries, a vehicle turning zone, whilst also used by pedestrians to get to the entrance].

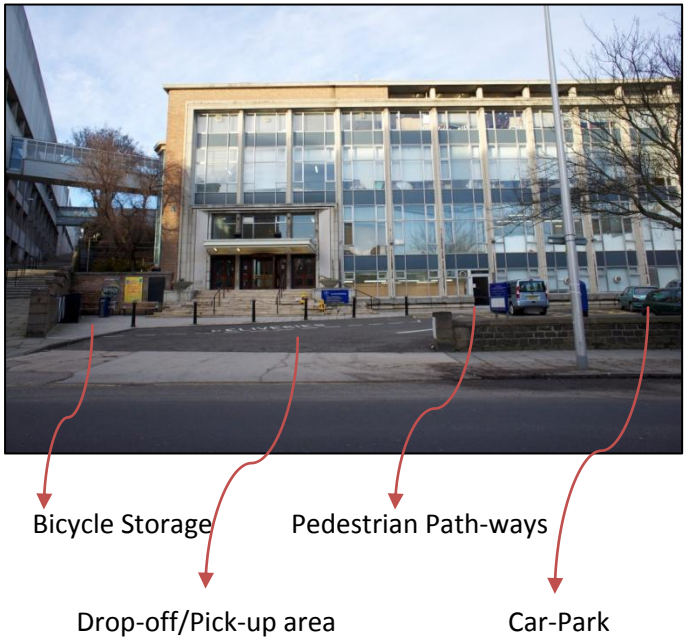


Figure 5.13: An Example of a Multi-Use Approach Route

The first major challenge of Approach communications is to enable the way-finder to identify the correct site before they move into the building. The second is to provide cues of identification and navigation to ensure an appropriate site threshold is crossed. The third is to warn of hazards, whilst navigating, orientating and instructing way-finders to the Entrance.

A significant finding to emerge from analysis of Approach communications was that a pedestrian path was found to be an extremely useful element in guiding way-finders through a Multi-use Approach Route [defined in figure 5.13]. Way-finders need communications to be able to: find a path which leads to the entrance; and when on the path, navigate and orientate in relation to the Entrance.

Previous researchers (Lynch, 1960;Ching, 1996;Unwin, 2009) have identified the importance of the path as an architectural element. Current findings, evidenced from this study, highlight that in communicating the Approach Path, an Architect can strategically choreograph way-finder's movements across a site to the Entrance of a building.

It was found from this study that Participants with less visual ability struggled to use a Multi-use Approach Route when way-finding through Journey Stage: Approach. A defined pedestrian pathway which is: easily distinguishable from a road or car-park; and leads way-finders directly from a public pavement onto a site pathway, provides a way-finder with certainty and reassurance. Communicating Pedestrian Pathways enable way-finders to:

- Independently find and follow a route through Approach to the Entrance
- avoid becoming lost
- navigate free from hazards caused by external obstacles [temporary or changeable];
- 'break-up' and become familiar with an otherwise external open space;

- be directed away from potential Multi-use Approach Route hazards [e.g. *'parked cars and moving parking cars'* as described by one of the Participants [Katie]]

A direct consequence of not being able to find and follow a pedestrian path through a Multi-use Approach Route [figure 5.13] has a negative impact on way-finder's emotional well-being and physical safety. A lack of understanding between users of Multi-use Approach Routes [e.g. between drivers of cars and pedestrians] was highlighted as a fundamental problem and affirms that road users are not often aware of the challenges faced by those with different forms of visual ability (Baker, 1999).

5.2.2 Journey Stage
Entrance

emerged based on external Task Components which occurred between entering the building and the immediate experience of welcome and reception. There were two top-level tasks within Entrance: 1. Entering and Welcome and 2. Forming a Strategy to get around the building. These tasks, framed [below] as a series of Way-finders Questions highlight the Communication Requirements of Journey Stage: Entrance.

1. Entering and Welcome

- *How do I get into the building?*
- *Is this the right type of door for me to use?*
- *How do I use this door?*
- *Is there an alternative door?*

- *How do I get to the alternative door?*
- *Am I allowed to use this alternative door?*
- *Is this the correct building?*
- *Am I allowed to be here and am I welcome?*
- *How will I get to the Destination?*

2. Forming a Strategy to get around the building

- *Can I find a member of Entrance staff?*
- *Can I understand directions given out by Entrance Staff?*
- *Can I find signage?*
- *Can I understand and use Entrance Signage?*
- *Can I access Way-finding Journey Information before I go to the building?*

There were several requirements of Entrance communications highlighted by analysis. The first incorporates a mix of identification, navigation and instruction communication to enable way-finders to get into the building. The second is to provide cues of identification to identify the correct building had been entered while the third is to provide cues of identification and instruction to find and provide understanding of a first point of directional information [e.g. signage or entrance staff]. There was also a requirement, previous to arriving at and entering the building, regarding gaining access to identification, orientation, navigation, warning, and instruction communications.

'First people have to find the door'(Arthur and Passini, 1992,p. 117). This statement proved appropriate regarding communication requirements in relation to entering a building [specifically in regard to finding the entrance and using different types of doors]. However,

current findings in relation to Entrance add to this statement: people have to be enabled to use the door-type which is best for them.

Participants in this study struggled to use revolving doors and were challenged by building staff in using alternatives. This demonstrates how important training of Entrance Staff is in relation to assisting and understanding the needs of people who have different abilities.

Journey Stage: Entrance was found to be a strategic point where the way-finding plan to get around the building is often formed. As one of the Participants [Adam] explained: *'Once I have got inside, this is where I figure out where to go next.'* The Entrance was also identified as the ideal area where information of how to exit the building in the case of an emergency should be given.

An interesting finding prompted by experience of Entrance was that if way-finding information was made available to way-finders, previous to arriving at a building, then they would use this to plan and prepare for their Way-finding Journeys.

Once inside the building entrance, Way-finders seek different types of Entrance communications to plan their journeys. The two main methods, dependent on visual ability and whether they are accompanied by someone acting as a guide, are: using Entrance Staff and using Entrance Signage. People with more visual ability tended to seek signage first and staff second, whereas people with less visual ability sought a member of Entrance Staff.

In this study signage was only useful to a way-finder with less visual ability if they were accompanied by a sighted person who used signs as way-finding cues. A manned reception by a 'patient' [Adam] receptionist, trained in giving different types of directions [not only visual directions], was found to be an ideal way in providing a way-finder with a 'welcome' and point of orientation.

The impact of not feeling welcome and a lack of initial way-finding cues within Entrance was found to not only establish a negative mindset for the rest of the journey, but influenced probability of future visits.

5.2.3 Journey Stage
En-Route Destination

emerged based on Task Components which occurred whilst way-finders undertook one main top-level task: Breaking the Journey. This task was composed of three sub-tasks: 1. making discoveries and having a rest, 2. using the toilet and 3. exiting in emergency.

These sub-tasks, framed [below] as a series of Way-finders Questions highlight the Communication Requirements of Journey Stage: En-Route Destinations.

1. Making Discoveries and Having a Rest

- *If I break the journey can I get back on the original route again?*

2. Using the Toilets

- *How do I get to the Toilets?*
- *How do I get to the Disabled Toilet?*
- *Is this the Male/ Female Toilet?*
- *What do I do to use the fixtures & fittings in the Bathroom?*

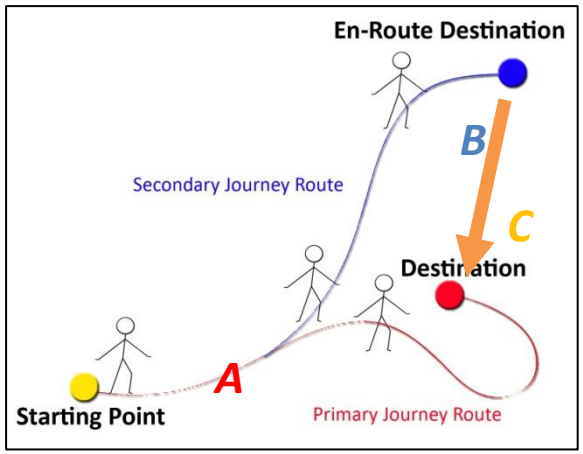


Figure 5.14: En-Route Destination Diagram

3. Exiting the building in an Emergency: Knowing what to do

- *What do I do in an Emergency?*

Incorporating En-Route Destinations into a Way-finding Journey was found to be subject to a way-finders' confidence. As illustrated in figure 5.14, it involved a way-finder taking part in deviating from the primary journey [A], reaching the En-Route Destination [B], and then making a plan to way-find to the original Destination [C].

In this study it was found that Way-finders with more visual ability were more inclined to deviate from a primary way-finding route. However it was also found that all way-finders will undertake En-route Destinations if afforded information to answer: *If I break the journey can I get back on the original route again?*

It is a Task Component which is dependent on a full sequence of Communication Requirements: 1. Orientation [i.e. *You are here and your en-route destination is there*], 2. Navigation [i.e. *This is how you get to the en-route destination from here*], 3. Orientation [i.e. *You are here - at the en-route destination, and the original destination route is there*], and 4] Navigation [i.e. *This is how you get to the destination*]. These Communication Requirements were found to enable Participants to take part in [En.D.T.1] Breaking the Journey.

People with less visual ability were less inclined to make discoveries as they preferred to not veer off the original track to their destinations. There are other factors influencing whether a way-finder will deviate from an original route. These include: What the way-finder wants to achieve within their Way-finding Journey [i.e. time constraints or leisurely way-finding]; or whether they are encouraged and given enough space to stop and rest at 'happenings' which interest them.

An unexpected finding was that some of the positive Way-finding Hot-spots experienced were the result of serendipitous encounters made on the journey. The joys which come from the ability/encouragement to make serendipitous encounters and way-find to En-Route Destinations add positively to the overall experience of Way-finding Journeys/being in the building.

Findings analysed from the En-Route Destination task of [En.D.T.1.2] Using the Toilet, complements and adds to previous research (Bichard et al., 2007;Bichard et al., 2008). A trip to the toilet is a Mini Way-finding Journey. Way-finders need communications to be able to: find the toilet/disabled toilet; identify and enter the appropriate gendered toilet and be instructed on how to use bathroom fixtures and fittings [such as the toilet flush].

What do I do in the Case of an Emergency? This is an extremely important question which requires a less visual, more sensorial [tactile, colour, sound and lighting], communication response. One of the most important En-route Destinations is the Emergency Exit. Way-finders, especially those with less visual ability, sometimes do not know what to do in the case of an emergency. It was highlighted that 'emergency exit' information should be available within the Entrance. Way-finders form an emergency exit plan and instructional communications should support this.

5.2.4 Journey Stage
Non-Specific

emerged based on Task Components which were not specific, particular or exclusive to a definable Journey Stage [e.g. Approach, Destination etc.]. Task Components within Non-Specific occurred either continuously or sporadically.

Seven top-level tasks [and their sub-tasks] framed [below] along with a series of Way-finders Questions highlight the Communication Requirements of Journey Stage: Non-Specific.

The first top-level task Finding and Following a Route through the Journey was composed of four sub-tasks relating to finding and following a route through: Building Layout, Volume, Spatial Depth/Distance and Corridor.

1. Finding and Following a Route through the Journey

Building Layout

- *Where am I in the context of this building layout?*
- *How do I advance my journey through this building layout?*
- *Will I be able to identify and plan/understand if a layout changes?*
- *Have Way-finding Communications [in relation to layout changes] been updated?*

Volume

- *Where am I in the context of the volume?*
- *How do I advance my journey through this volume?*

Spatial Depth/ Distance

- *Where am I in the context of this distance?*
- *How do I advance my journey through this distance?*

Corridor

- *Where am I in the context of this corridor?*
- *How do I advance my journey through this corridor***?**

The *Where am I* questions are dependent on a form of orientation communication whereas the *How will I progress my journey through* questions are dependent on a form of navigation communication.

The first major challenge of Non-Stage Specific communication is to enable the way-finder to locate their immediate surroundings within the context of an entire building. Second is to enable them to navigate their Way-finding Journeys through the building layout. Another finding which slightly contradicts this was that a clear understanding of the immediate context layout specific to each journey, rendered knowledge of the overall building layout unnecessary.

Communications to orientate within a volume and also within a spatial depth/distance was highlighted as vital for way-finders to know where they are and know where building elements are [e.g. staircases]. This was aided if a space was broken-up by points of orientation such as landmarks. As highlighted by this study, being able to sense and define boundaries is helpful for people with less visual ability.

These communications, [in addition to the 'breaking-down' of a building, layout, volume, spatial depth/distance and corridor] make the task of *finding and following a route through the journey*, less demanding.

An additional finding relating to reliability of building communications highlighted how important up-dated communications were to way-finders. Predictability is extremely important for people with less visual ability (Bernsen, 1996). If a building changes then it was deemed helpful if way-finding communications were updated to match and relate to the reconfigured layout. This avoids confusion and frustrations when way-finders are not able to rely on existing knowledge of a journey.

2. Using Public Spaces and Avoiding Private Spaces

The second top-level task, Using Public Spaces and Avoiding Private Spaces was composed of one Participant Question:

- *Should I be in this area – Is this a Public or Private area?*

The challenge of identification communication in this instance can aid way-finders to distinguish between private and public spaces/rooms/areas and avoid them encountering some of the more embarrassing Way-finding Hot-spots.

3. Dealing with being Lost or Disorientated

The third top-level task, Dealing with being Lost or Disorientated was composed of two Participant Questions:

- *Where am I – am I lost?*
- *How do I become 'un-lost'?*

Orientation and Navigation communication is required to enable way-finders to first, recognise that they are lost and second, create a new way-finding plan to become *'un-lost'* [Adam].

Becoming lost or fear relating to losing one's way, was highlighted as having particular impact on Participants' feelings of security and emotional well-being when undertaking a Way-finding Journey.

4. Going Through a Door

The fourth top-level task, Going Through a Door was composed of one Participant Question:

- *How do I get through this door?*

Instruction communication is required to provide a way-finder with guidance on how to operate the door. Constancy in regard to the position of handrails, whether the door is a *push* or *pull* were factors highlighted as aiding a way-finder to get through doors.

An interesting finding was that throughout the Way-finding Journey, Bruno [Katie's guide dog] stopped and sat down in front of every door they were about to walk through. Katie explained: '*Bruno stops to tell me that there is something that I need to pay attention to...like doors or stairs.'*

5. Negotiating a Change in Level

The fifth top-level task, Negotiating a Change in Level was composed of four sub-tasks: Using Stairs, Using Lifts, Using a Ramp and Using Escalators and Moving Walkways.

Using Stairs

- *How do I get to the stairs?*
- *Where am I on these stairs?*
- *Is this stair going up or down?*
- *Is this a stair or a landing?*
- *Are there any hazards on these stairs – where are they?*
- *How do I get to the handrail?*

There are five main communication needs in regard to using stairs: Navigation communication to enable way-finders to find the stairs; Orientation communication to enable way-finders to orientate and mark-out the stairs; Identification communication to enable way-finders to differentiate between a landing and stair; Warning communication to

enable way-finders to avoid and deal with hazards on stairs and; Navigation communication [*'place your hand here'*] enables way-finders to find and use the handrail.

Using Lifts

- *How do I get to the lift?*
- *What floor do I want to go to in relation to the floor I am on?*
- *How do I get to the floor I want to be on?*
- *What do I have to do in this lift to get to that floor-What button do I press?*
- *What floor is this? Is this the floor I want to be on? What is on this floor?*
- *Where am I on this floor, what do I do now?*

There are three phases in regard to using lifts: getting to the lift, being inside the lift and exiting the lift.

To get to the lift a form of navigation communication is needed to enable way-finders to find the lifts. Once inside the lift three types of communication were required: orientation communication to enable way-finders to know what floor they are on; navigation communication to enable way-finders to be able to get to the floor they want to be on and; instruction communication to enable way-finders to use the lift controls in relation to where they want to go.

When exiting the lift two forms of communication were required: identification communication to enable way-finders to decide if the floor they have arrived on, is the floor they want to be on, and; orientation communication to enable way-finders to gain knowledge of where they are when exiting a lift in relation to where they want to go next.

Using a Ramp

- *Is this a step or a ramp?*

There was found to be one main communication need in regard to using a ramp: identification communication to enable way-finders to distinguish between a ramp and a stair/other surface.

Using Escalators and Moving Walkways

- *How do I know if I am at the end of the moving escalator/ walkway?*

There was one main communication need in regard to in using an escalator/ walkway: instruction communication to enable way-finders to prepare to exit from the escalator or moving walkway. The first challenge of negotiating a change in level communication is to indicate the location and the type of the vertical circulation. This enables way-finders to navigate and select a form of vertical circulation suitable for them. There were several significant findings in relation to Negotiating a Change in Level.

Way-finders who have a guide-dog may favour stairs if their guide-dog does not like being in lifts. Accompanied by her guide-dog, Katie was able to use the command *'find the stairs Bruno'* when navigating to staircases. However, problems arise when stairs are transparent [e.g. glass staircases or open tread stairs] as Katie explained: *'Bruno won't go up stairs if they are open in any way or if they are made of glass. He can't see where to put his feet, so he just refuses'.*

A tactile strip - placed on the edge of individual steps as opposed to being set back into the step - was highlighted by Participants as a method which enabled them to distinguish

between individual steps. Handrails were found to be extremely important to enable Way-finders to mark-out and orientate themselves whilst on stairs/staircase.

Way-finders who were less dependent on others preferred to use the stairs as opposed to a lift. Adam explained that this was because: *'More information can be acquired when you're walking about compared with when you're in a lift'.*

6. Avoiding and Dealing with Hazards

The sixth top-level task, Avoiding and Dealing with Hazards was composed of hazards of: floors, walls, lighting and other people. Way-finder's Questions in relation to these were:

- *Are there any hazards?*
- *Where are they?*
- *What are they?*
- *Are they temporary or permanent?*
- *What do I do?*

The challenge of warning communication in this instance is to aid way-finders in pre-empting and have prior knowledge of a potential hazard before they encounter it. Identification communication is required to enable way-finders to know what and where the hazard is, and a form of instruction information is needed so that way-finders know what to do. Distinction between temporary and permanently placed objects was also highlighted as being beneficial.

There is the potential to experience hazards throughout a *Wa*y-finding Journey in relation to the floor, walls, lighting and other people. Evidenced from this study, sources of these hazards are the result of placed objects, fixtures and fittings, building finishes, light changes and the etiquette/manners of other way-finders. It is interesting to note that warning communications can prepare way-finders before they encounter a hazard, for example,

different types of light affects people with different types of visual loss. Communications to indicate and warn of light changes were raised as being beneficial to enable way-finders to prepare to enter a space with a specific type of light. Evie stated: *'Sometimes if I know I'm about to go into a really bright room I will close my eyes completely and this way I can protect myself.'*

7. Collecting Information to Way-Find By

The seventh and final top-level task of Non-Specific, Collecting Information to Way-Find By, was composed of five sub-tasks: using landmarks, using visual signage, using tactile cues, using audio cues and lastly, relying on others. Way-finder's Questions include:

- *Can I use these landmarks as way-finding cues?*
- *Can I use these signs as way-finding cues?*
- *Can I use these textures as way-finding cues?*
- *Can I use these audio announcements as way-finding cues?*
- *Can I use another person as a provider of way-finding cues?*

In collecting information to way-find by, way-finders require: Identification, Orientation, Navigation, Warning, and Instruction communication. In this study way-finders used landmarks, signs, textures, audio cues and other people when seeking this information.

Landmarks were identified in this study as building elements, external views, colours, smells, sounds etc. Regardless of visual ability, landmarks provide way-finders with the *'little signs'* [Katie] enabling them to advance their Way-finding Journeys through a building. They are used both as tools of orientation and navigation, and markers of identification.

There are three types of signage user: those who always tried to use signage, those who sometimes used signage, and those who never used signage. Obviously the using of signage

was dependant on visual ability. Those way-finders with more visual ability tended to use signage as a form of: identification, orientation, navigation, warning, and instruction communication. The weakness of signage is outlined in detail within [N/S.T.7.2].

There are three forms of tactile communications highlighted within this study: Braille Signage, Tactile Maps and Tactile Interventions.

Not all way-finders with visual loss can read Braille. Those who can need information in regard to: 1. finding it [as James highlighted in [N/S.T.7.3] *'I can't see it* [a Braille sign] *to know it is there'*], 2. understanding its message and meaning, and 3. being able to engage with its format and design.

Not all way-finders with visual loss have had experience of using tactile maps. The non-standardisation of tactile maps was highlighted as impacting negatively on it being a useful way-finding aid.

Textures can provide a range of way-finding communications; however non-standardisation of tactile interventions weakened them as being a useful aid.

Way-finders also use audio forms of communication. These were found to be helpful in regard to, for example, departure gate information at an airport. However, they also were found to potentially have a detrimental impact on Way-finders Journeys. They disrupt a way-finders focus, are unclear and confusing and are *'loud and annoying'* [Jack].

Participants' experience of [N/S.T.7.5.1] Relying On Others: Overcoming Social Awkwardness highlighted the impact social interaction with other people can have on *Way*-finding Journeys. Appropriate communications to support way-finding by people, regardless of visual loss, may mitigate the need to ask for help from other people. However, overcoming

Social Awkwardness is not thought to be an issue resolvable through design of way-finding requirements.

Criteria of Way-finding Communications

There were several fundamental considerations of Way-finding Communications highlighted by this study. Way-finding Communications were highlighted as helpful if they are:

- Coherent and articulate a clear and concise message to the way-finder in relation to their way-finding journey.
- Consistent and provide the way-finder with clear instructional advice. From *Journey Stage: Approach* through to *Journey Stage: Destination* consistency is more than just an aesthetic issue. If Way-finders find a form of communication which supports their way-finding at the beginnings of a Way-finding Journey, they will become conditioned to seek similar communications throughout their way-finding.
- Accurate, timely and enable way-finders to pre-empt what is about to happen. In this study, there was a distinct lack of communication available in stairwells and in the middle part of the journey. Similarly, a lack of being able to pre-empt a trip hazard or cracked stair often resulted in the way-finder experiencing an accident.
- Positioned within logical places and free from other forms of miscellaneous information and sensorial distraction.
- Up-dated to reflect changes within the building [i.e. extensions, relocation of activities etc.]
- Presented in a format which can be used by a wide range of people with different way-finding needs. This point comes with a warning to designers and architects which was raised by, Lily, a Participant who could not read Braille: *'they* [Architects]

seem to think that as long as there is Braille on a sign then they have covered visual impairment – they have ticked that box - and they don't really need to make any other effort. But what am I supposed to do?'

5.2.5 Journey Stage
Destination

emerged based on Task Components which occurred whilst way-finders undertook the final stage of a Way-finding Journey. Journey Stage: Destination encompassed Way-finding Hot-spots which occurred within the locale of the ultimate Destination.

There was one top-level Task Component of Finishing the Journey: Getting to the Destination. It was made up of three sub-tasks: Stopping on the Destination Floor, Finding the Destination within this floor and Identifying and Stopping at the Destination. These tasks, framed [below] as a series of Way-finder's Questions highlight the Communication Requirements of Journey Stage: Destination.

Finishing a Way-finding Journey

- *Am I near the Destination?*
- *How do I get to the Destination?*
- *Is this the Destination?*

Within the final stages of a Way-finding Journey the rhyme from a children's game 'Finding the Thimble', *'warm…hot …roasting hot…you've made it!'* seems apt in describing the Communication Requirements of Destination. The first major challenge of Destination communications is to enable the way-finder to identify that they are within the locale of their

destination before they move to a different part of the building. The second is to provide cues of navigation to enable the Way-finding Journey to advance to the destination. The final Communication Requirement is to enable the way-finder to identify and determine whether the correct Destination has been reached.

A significant finding to emerge from analysis of Destination communications was that there was a real lack of communications within the concluding steps of Way-finding Journeys. One of the most interesting findings of Journey Stage: Destination was that several of the participants were not able to identify that they were in the locale of their destinations. This resulted in them walking past their destinations [sometimes to other floors within the building]. Way-finders require Identification communication in order to determine that they are on the correct floor for the location of their destination. It would be ideal if this provided information relating to: *This is the floor/area/zone that your Destination is on' and 'Find the Destination within this floor as opposed to the rest of the building.* Once identifying that the locale of the destination has been reached [*i.e. The Destination is close*] there is a navigation requirement to enable the way-finder to arrive at the destination within that floor/area/zone [*i.e. follow this route to get to the destination*]. Lastly, way-finders have to be able to identify their destinations and stop [i.e. *This is the Destination*].

Section Summary

This section has described and presented the main research outcome: *The Experiential Charting of a Way-finding Journey.* It has discussed Communication Requirements in relation to all five Journey Stages. Before considering what knowledge has been extracted from *The Image of a Way-finding Journey*, this section is concluded with a summary which lists the fundamental issues of a way-finding journey [Figure 5.15].

Way-finding Journeys: Fundamental Issues
Journey Stage: Approach is where the Way-finding Journey begins and where the first way-finding communications should be made available.
Way-finders need to be enabled to enter the desired site via an appropriate threshold.
The use of bollards [or other forms of low level, non-indicated obstacles] should not be used within Journey Stage: Approach.
Way-finders need to be enabled to identify and confirm their desired building *before* they enter the front door.
A pedestrian path is an extremely useful element to guide way-finders through a *Multi-use Approach Route*. It can guide way-finders from the site boundary [public footpath] to the entrance point of the building.
Way-finders need to be enabled to: find a path which leads to the entrance; and when on the path, navigate and orientate in relation to the building entrance.
Way-finding Information – made available prior to embarking on a way-finding journey around a building – enables a way-finder to plan their journey prior to their arrival at a building.
Journey Stage: Entrance is identified as the stage where the plan to get around the building is formulated hence is the optimum area where way-finding communications should be made available.
People, regardless of visual ability, need to be enabled to exit a building independently in the case of an emergency.
Journey Stage: Entrance is identified as the area where information on how to exit the building in the case of an emergency should be made available.
It is vital that Entrance Staff undertake training which enables them to understand the needs of people who have differing abilities and therefore different requirements.

Figure 5.15: Way-finding Journeys: Fundamental Issues/01

Way-finding Journeys: Fundamental Issues
A Receptionist, trained in giving non-visual or less-visual way-finding directions is identified as a source of way-finding communication which would enable way-finders [with varying visual ability] to plan, understand, and ask further questions about their journeys around a building.
Way-finders need to be enabled to break from their original way-finding journey and incorporate en-route destinations such as exploring the building, resting, or going to the toilet.
It is vital that way-finders, regardless of visual ability, be afforded way-finding communications to way-find to the toilet in a public building.
Visiting En-Route Destinations [such as deviating from the original route to investigate a building, piece of art work or having a rest] can enhance the way-finder's experience of their Way-finding Journeys.
It is vital that spaces are broken-down to enable people with visual loss to interpret their surroundings. Large, deep, *volumous* [sic] spaces can be confusing and difficult for someone with visual loss to interpret.
Up-to-date forms of way-finding communications [Identification, Orientation, Navigation, Warning and Instruction] are extremely important. If the building changes, the way-finding communication must support these changes.
Way-finders need to be able to identify between public and private areas of the building.
On stairs, a tactile strip should be placed at the edge of the step to enable a way-finder with visual loss to 'mark-out' the steps. It should not be set-back into the step.
Way-finders must be enabled to identify and avoid Hazards [temporary or permanent] throughout their Way-finding Journeys.
Identification, Orientation, Navigation, Warning and Instruction communications are vital to enable and enhance Way-finding Journeys.
Way-finders need to be enabled to identify the floor, area, zone of their Destination.
To conclude their Way-finding Journeys, Way-finders need to be enabled to identify and stop at their Destination.

Figure 5.15: Way-finding Journeys: Fundamental Issues/02

5.3 Discussion Themes from the 'Image' of a Way-finding Journey

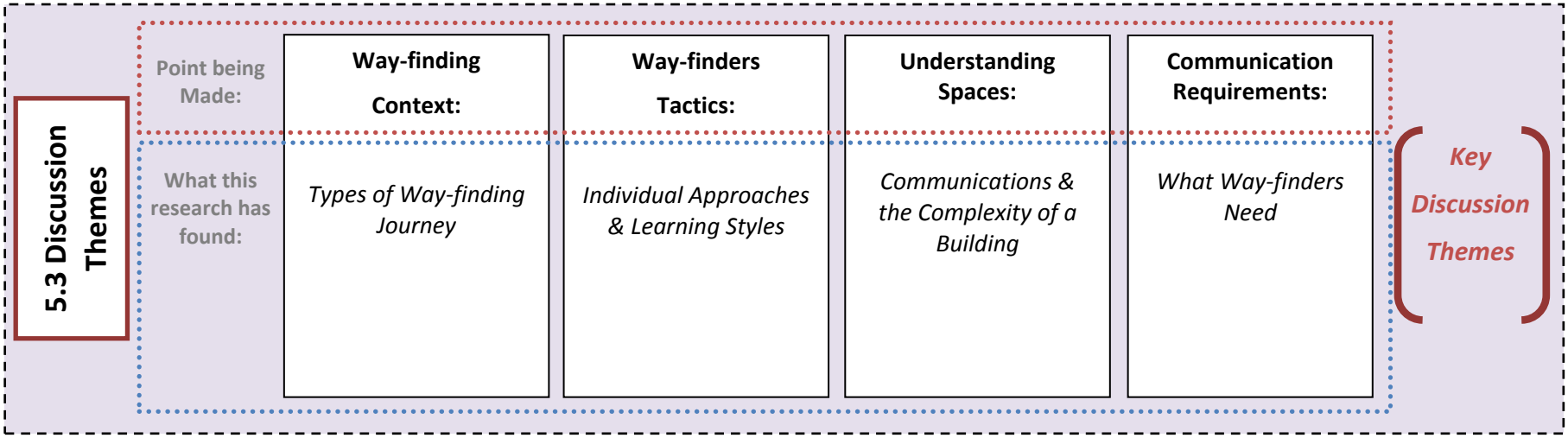


Figure 5.16: Discussion Themes

Derived from the participant data, and as illustrated in figure 5.16, there are four fundamental themes which will now be further discussed:

1. Way-finding Context: Types of Way-finding Journey;

2. Way-finders Tactics: Individual Approaches and Learning Styles;

3. Understanding Spaces: Lack of communication is the leading cause of major way-finding problems rather than the complexity of a building and;

4. Communication Requirements: What Way-finders Need.

5.3.1 Way-finding Context: *Types of Journey*

Way-finding is a purposeful, directed, and motivated movement from a starting point to a pre-determined destination (Golledge, 1999;Allen, 1999). A way-finder continually interacts with their surrounding context as they get from A to B (Arthur and Passini, 1992). Previous researchers have categorised types of way-finding in different ways. Arthur and Passini (1992) focus on the environmental condition [an exocentric position] and state that way-finding conditions include: normal, recreational and emergency. These, they claim, take place in four types of setting: travel, work, recreational and retail. In contrast, Allen (1999) takes an egocentric position and focuses on the person. He distinguishes between three categories of way-finding tasks which include: travel with the goal of reaching a familiar destination, exploratory travel with the goal of returning to a familiar point of origin, and travel with the goal of reaching a novel destination.

This study makes a separate form of Way-finding Journey distinction which is more aligned with Allen's (1999). Regardless of the type of building, Way-finding Journeys are based on what the person wants to achieve. This study has categorised two, opposite types *of Way-finding Journey:*

On a Mission Way-finding Journey – when factors such as time impact on a Way-finding Journey, for example: getting to a meeting on time or exiting a building in the case of an emergency

The Wandering Way-finding Journey – when undertaking a more leisurely Way-finding Journey for example: exploring a shopping mall or art gallery.

These two types of Way-finding Journey, could take place within any type of setting [e.g. a hospital, an office block, transport hub, museum, shopping mall etc.]. Both types can occur

within one journey as one can change to become the other. For example: The Wandering Way-finding Journey of exploring an art gallery could potentially become an On a Mission Way-finding when meeting a friend at a specific time and place for a coffee.

The dominant influence on the type of Way-finding Journey is dependent on what the way-finder wants to achieve.

5.3.2 Way-finders Tactics: *Individual Approaches and Learning Styles*

Visual ability is not the predominant factor which impacts on Way-finding Hot-spots. Skill is an important factor (Ingold, 2000). This study has found that individual approaches and learning styles also play a vital role. In addition to the types of Way-finding Journey which have already been defined, there are many other variables [person and contextual] which influence and impact on a Way-finders Journey.

Way-finders each bring unique abilities, limitations and memories (Lynch, 1960;Arthur and Passini, 1992;Ingold, 2000) of past Way-finding Journeys into journeys through undiscovered buildings. As Ingold describes, way-finding is a skilled performance. The traveller, whose powers of perception and action have been fine tuned through previous experience 'feels his way' towards his goal, continually adjusting his movements in response to an ongoing perceptual monitoring of his surroundings (Ingold, 2000).

People use various spatial, cognitive, and behavioural abilities to way-find (Allen, 1999). The way-finder brings with them a set of 'baggage' [illustrated in figure 5.17] and with this, they react and respond to the surroundings of their Way-finding Journey.

Way-finding Journeys are emotional roller-coasters which are full of excitement, anxiety, fear, joy, frustration, uncertainty and achievement. The Way-finding Hot-spots experienced on these journeys impact on a way-finder's physical safety and emotional wellbeing. A

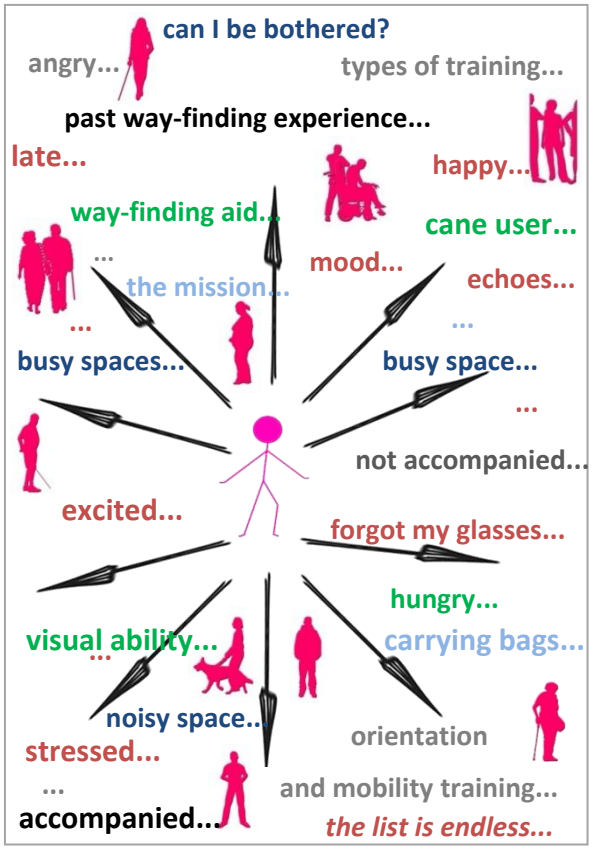


Figure 5.17: Individual Approaches & Learning Styles [Variables of Participants involved with this study can be found in *Participant Profiles* within Appendix C].

significant finding to emerge from this study is that, in addition to reacting to Way-finding Hotspots by *getting away from a situation*, *adopting a 'just keep going' mentality* and *apologising,* way-finders develop strategies to aid them in their Way-finding Journeys.

The most fundamental finding was that people with more visual ability tended to use visual strategies [e.g. using signage, interpreting visual landmarks and making assumptions based on looking at the surroundings], those with less visual ability used non-visual sensorial strategies [e.g. using hearing to orientate, using smell to navigate and identify, using touch to instruct and using residual visual ability to warn], and those within the middling range of visual ability used both visual and non-visual sensorial cues.

To remain contextually aware of their surroundings during way-finding, all Participants took part in a strategy of *gathering and remembering* information about their surroundings as they passed through them. This accords with findings presented by Authur and Passini (1992).

All Participants in this study with varying types of visual ability were found to have developed their own strategies for breaking down their journeys. There was however a scale of managing this breaking-down of tasks and this was found to be dependent on their level of visual ability. At a micro scale Participants with less visual ability were found to number steps and count landmarks. This finding compliments literature put forward by Harper and Green, who reported that result of breaking a journey into steps resulted in the person creating cognitive maps which were 'egocentric, exact, and divided into smaller more manageable steps' (Harper and Green, 2000,p. 2).

In addition to relying on aids which way-finders bring with them to a building [e.g. cane, guide-dog, navigational systems etc.] way-finders also rely to different degrees, on other

people. The amount was found to be dependent on past way-finding experiences and context of surroundings. It was not necessarily dependant on type or degree of visual loss but was definitely dependant on when in the person's life the sight loss came about/how long they have had their visual loss and if they have received orientation and mobility training. There are four levels of depending on others highlighted by findings from this study:

1) Very dependant – always guided by another person [arm in arm]

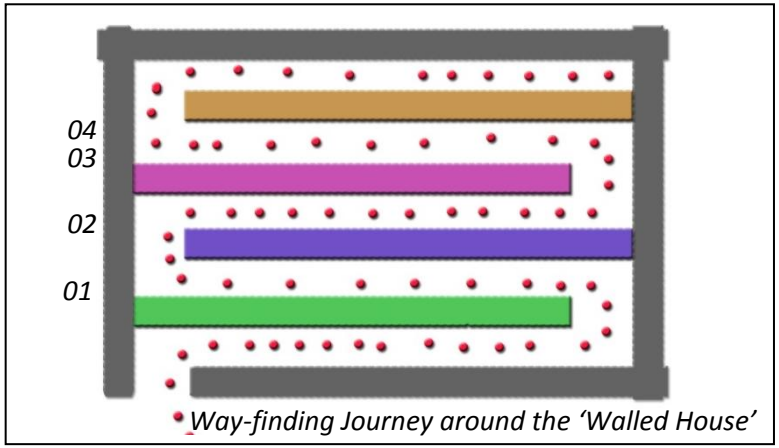
2) Medium dependant –relying on another person, learning from them and then way-finding independently on the next visit [i.e. *'show me this time and I will do it myself the next time'*]

3) Mostly independent – sporadic dependency, asking for directions at random points throughout way-finding [i.e. *'I can do it myself and I will ask staff or other people for directions'*], watching and learning from other people [i.e. *to know where the girls toilet is I just watch which way the girls go'*] or following the crowd.

4) Over independent – unwilling to depend on someone else and not wanting to seek help [i.e. *'I didn't know where I was going but I didn't want to ask anyone'*]

In addition to the previous concluding point - The dominant influence on the type of Way-finding Journey is dependent on what the way-finder wants to achieve - it can be concluded from this section that:

Each Way-finding Journey is influenced by the way-finder's individual approaches and learning styles. Each Way-finding Journey is Individual.



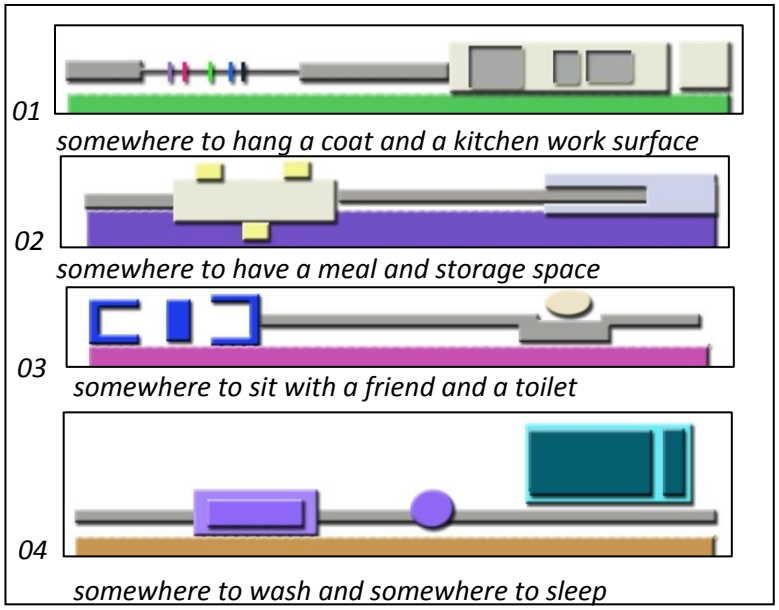


Figure 5.18: The Wall House by Akira Inafugi (Unwin, 2009)

The house is essentially a series of walls which are populated with furniture, fixtures and fittings. The person follows the wall as they navigate to move around their house. [This precedent is explored further within Chapter2: Review 4.]

5.3.3 Understanding Space: *Communications and the Complexity of a Building*

Buildings do not need to be mundane or without spatial interest in order for someone to successfully find their way (Arthur and Passini, 1992). On the contrary, and building on Arthur and Passini's (1992) work, this study has uncovered participant way-finding narrative which identifies that way-finding design needs to be interesting as its main requirement is to hold the attention of the way-finder.

Indeed, the simplifying of a building may be detrimental to a way-finder's ongoing developing way-finding skill set. For example, one *unchallenging building* can make the next *challenging building* entered seem impossible to get around. If the blind person living in the 'Wall House' [figure 5.18] visits a sighted friend's house will he have to rely on his friend to find a place to hang his coat, take him to the toilet, and find the sink to wash his hands?

The major component to enable way-finding through a space, regardless of complexity, is the way in which that space or series of spaces is communicated to the way-finder. The means by which a building layout is communicated was a factor which affected Participants' ability to find and follow a route through a Layout. This has been highlighted by the anecdotal evidence within Chapter 4 were Adam expressed the opinion that a clear understanding of the immediate context layout specific to each journey, rendered knowledge of the overall building layout unnecessary. He explained, '*building layouts can be really confusing and quite hard to read sometimes if there is nothing breaking them up for me. I find that building layouts don't really matter. [...] I just need to know the bits I need to know. [...] "this area is this and that area is that" [...]'.*

At a macro-level, the Architect's challenge is to break-down and translate the context of a Way-finding Journey to the way-finder. Through understanding, at a micro level, the task

components and way-finders questions, appropriate types of communication can aid to mitigate Negative Way-finding Hot-spots and enhance experiences of Positive Way-finding Hot-spots.

The second point to be made here is that if a complex space, building, volume or distance is not sub-divided it too can have a detrimental impact on a way-finder's ability to way-find. For example a Participant, Jack explained that if an area is divided up then it is easier for him to estimate the distances: *'When something is quite far away, I have no clue how far away it actually is so I don't know how long it's going to take me to get there. When a big area is divided up its easier for me […]'.*

Vast spaces [external and internal] with lack of distinct features neglect to support way-finding ability of people who use non-visual and less visual strategies. The strategies they rely on become redundant, diluted and are less effective [i.e. if large volumes are not broken-down into smaller areas, echoes dilute all cues of sound which aid people with visual loss in seeking out boundaries or building elements such as: walls, doors, windows etc].

Way-finders' journeys become enabled and enhanced when the scale of a building, volume, space etc. is broken down and communicated as smaller components. Indeed, 'Access to information is what it is all about' (Arthur and Passini, 1992,p. 72). Communications are the key in supporting a way-finder's journey through a building.

Lack of communication is a major cause of way-finding problems rather than the complexity of a building.

5.3.4 Communication Requirements: *What Way-finders Need*

It was one of the objectives of this research to answer - *What do people need to way-find in a building?* Appropriate Communications has been established as being the answer. The specific Types of Communication Requirement will now be considered.

Regardless of visual ability, the impact of a lack of appropriate communication has a detrimental impact on way-finders' emotional and physical wellbeing and safety. Fear, anxiety, frustrations, shock and even anger are experienced when way-finders' surroundings do not support their Way-finding Journeys.

Specific to visual ability, a lack of appropriate communication can make people more aware of their visual loss. Therefore, under the social model of disability (Oliver, 1990), their surroundings are disabling them. This is a form of architectural disablement (Goldsmith, 1997).

This research has established the requirements of communications [through the Way-finders Questions] and evidenced how way-finding communications have and have not been able to meet the needs. There are five types of Communication Requirement: Identification*,* Orientation*,* Navigation*,* Warning* and Instruction highlighted by a Way-finding Journey.

Some of these types [*] have been defined by others in regard to visual signage systems (Berger, 2005;Arthur and Passini, 1992;Royal National Institute for the Blind, 2006). However, defined in this study [below], and adding Instruction Communication to the mix, these Communication Requirements can be understood in regard to a broader, more sensorial encompassing, base of holistic communication formats [i.e. visual, less visual and non-visual].

An *Identification Requirement* highlighted a need for way-finders to be enabled to affirm, label and distinguish between elements of a Way-finding Journey. Identification is the knowing that this is someone's office door or the smells which denote that a cafe is near-by. It is the edging which makes it easy to differentiate between a stair and a ramp and it is the distinction made between a male and a female bathroom. It can also offer way-finders a choice, for example, if they are able to identify that there are two different door types to enter a building by, they can choose the one which they prefer to use.

An *Orientation Requirement* highlighted a need for way-finders to be enabled to establish where they are in relation to their surroundings. Orientation Communication establishes the answer to the *where am I in this context* question of a Way-finding Journey and can also aid to inform the way-finder if they are lost. It is from this position of orientation that the way-finder takes measures to plan their Way-finding Journey in relation to where they are. This formulation of a Journey Plan is when Navigation Communication is needed. Orientation and Navigation Communications work together in supporting a Way-finder through a building.

A *Navigation Requirement* highlighted a need for way-finders to be enabled to form a plan to get to where they want to be from where they are. The question changes from an orientation question: *Where am I in this context?* to a navigation question: *How will I advance my journey through this context?*

A *Warning Requirement* highlighted a need for way-finders to be given advanced warning of a potential hazard. It indicates the position of hazards and denotes whether they are permanent or temporary.

An *Instruction Requirement* highlighted a need for way-finders to be given instructional information to undertake operational tasks such as opening a door, or understanding and putting information from communication [e.g. spoken directions from staff] into action.

There are five types of Communication Requirement Way-finders need to support their way-finding journeys around buildings - Identification, Orientation, Navigation, Warning and Instruction.

Section Summary

Before summarising these key findings it is important to take a pause to consider those way-finding issues which cannot be solved through Communication Requirements.

- [A.T.2.1.1] Communicating with Multi-Use Approach Users
- [N/S.T.6.4] Avoiding and Dealing with Hazards: Other People
- [N/S.T.7.5] Relying On Others: Overcoming Social Awkwardness

These three Task Components were based on issues best considered by a social researcher as they are based on how people interact with each other. However, the design of the environment is vitally important as it can facilitate or inhibit social interactions.

Four distinct pieces of knowledge have been distilled from the *Image* of the Journey and figure 5.19 [originally introduced at the beginning of this section as figure 5.16] frames a summary of the discussion themes relating to what knowledge has come from the Image of a Way-finding Journey. *What did the Image tell us about how people, with varying degrees of visual loss, find their way through a building?*

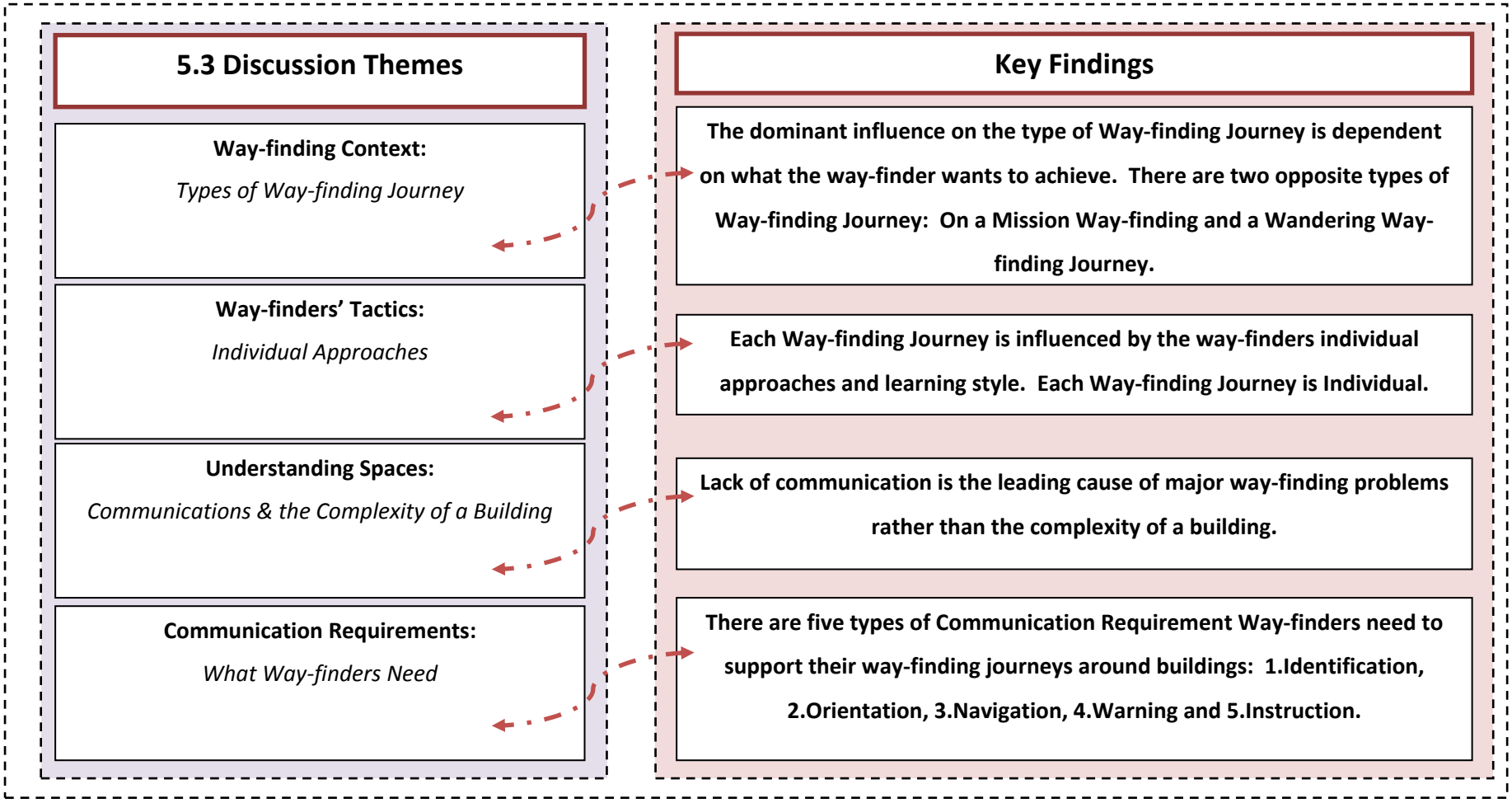


Figure 5.19: Summary of Discussion Themes

5.4 Chapter Summary

When the scope of the research was outlined in Chapter 1 and 2, it was apparent that a broad bed of literature spanning across disciplines determined that the research was going to be exploratory in nature. There was a lack of existing knowledge in understanding the task of way-finding throughout a building undertaken by people with different visual abilities.

As a result of recognising this gap in the current knowledge [and as described in Chapter 3], a set of themes and research questions fuelled the pursuit to provide a method of understanding a user-centred study focused on way-finding within the context of a building.

In addition to bringing together the full themes of the research [as presented, evidenced and discussed in Chapter 4] this Chapter has discussed the key findings in relation to the research question and within the context of way-finding literature. The exploration and theoretical development of *The Experiential Charting of a Way-finding Journey* has been distilled down to focus on several fundamental themes, concepts and arguments. The founding concepts and characteristics of a Way-finding Journey were established. The Constructed *Image* of *The Experiential Charting of a Way-finding Journey* was presented and the key themes drawn out of the *Image* were discussed.

The driving force of this current study took a fundamental shift by placing the focus on the person and their experience of way-finding through their surroundings – the environment encountered model. This research has indicated that way-finding design should not be focused on the static idea of building components (Ching, 1996;Arthur and Passini, 1992). It should however be understood as a very much active concept of a Way-finding Journey which is composed of Way-finding Hot-spots. Way-finders, regardless of visual ability, experience both positive and negative Way-finding Hot-spots.

A Way-finding Journey is composed of Journey Stages which are constructed of a hierarchy of Task Components and Communication Requirements. Understanding a Way-finding Journey is fundamental in ensuring way-finding design responds to Way-finder's Questions.

There were four key findings evidenced by the 'Image' of a Way-finding Journey:

- The dominant influence on the type of Way-finding Journey is dependent on what the way-finder wants to achieve.
- Each Way-finding Journey is influenced by the way-finders individual approach and learning style. Each Way-finding Journey is Individual.
- The complexity of a building is not the leading cause of major way-finding problems [Negative Way-finding Hot-spots]. The lack of communication is.
- Way-finders need five types of communication requirement on a Way-finding Journey: 1.Identification, 2.Orientation, 3.Navigation, 4. Warning and 5.Instruction.

All way-finders regardless of ability should at the least, be able to find their way to their chosen destinations. Regardless of support systems and technologies that a way-finder may bring into a building [e.g. guide dog, cane, map, computer device] the building needs to communicate to the way-finder: *'It needs to give us little clues'* [Katie]. With further design consideration, way-finders can feel safe and secure if the surroundings give them confidence; a building which provides clear communication will offer an experience which is richer than simply the facilitation of arriving at a destination.

The following, final chapter of the thesis, concludes the journey of the whole PhD process. With critical reflection, the research contribution, significance and relevance of research findings and limitations of the study are considered before speculative recommendations are made for future research.

Chapter 6

Post-Conclusion & Critical Reflection

Implications, Significance and Relevance of Findings

‘Are we nearly there yet?’

6.0 Chapter Introduction

This interdisciplinary doctoral research, based within architecture, has investigated way-finding within public buildings by Participants who have varying degrees of visual ability.

Way-finding is an established area in research (Arthur and Passini, 1992;Barker et al., 1995;Golledge, 1999). However until this point, experience of way-finding within a building as undertaken by Participants with varying degrees of visual loss had not been recorded, analysed, and presented. Furthermore, a method to investigate this was lacking, hence the approach used within this current research study is distinctly new.

Through the design and utilisation of an innovative set of methods, this research project has generated a unique and relevant new theory and hierarchical system to describe way-finding undertaken by people within a building: *The Experiential Charting of a Way-finding Journey.*

Different from previous way-finding research, this study has not just concentrated on the negative experiences of way-finding. Through exploring the positive and negative experiences of way-finding experiences, a more complete picture of a Way-finding Journey around a building has been depicted. This study has been an 'opening up' of the problem area and provides an understanding of way-finding which, evidenced as Participants' Way-finding Hot-spots, has evolved into a hierarchy of Task Components and Communication Requirements.

The significance of five categories of Way-finding Communication: Identification, Orientation Navigation, Warning and Instruction, which emerged from the data as supporting, enabling and enhancing experience of Task Components, have been defined and their importance in relation to Journey Stages demonstrated. The full analysis and discussion of *The Experiential*

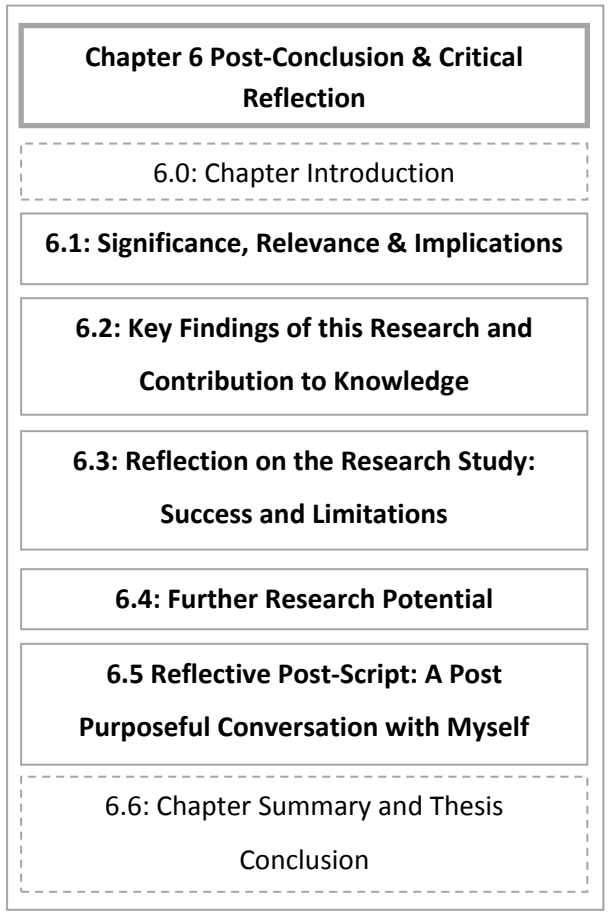


Figure 6.0: Chapter Outline

Charting of a Way-finding Journey has been fully discussed within Chapter 4 and the full extent of the creative and original contribution is presented within Chapter 5.

This, the final Chapter of the thesis [outlined in figure 6.0] concludes the PhD journey with a period of critical reflection and evaluation. The Researcher now reviews the *way-finding* of this research process and suggests several ways to take the study of *Way-finding Journeys* forward.

Section 6.1 Significance, Relevance & Implications, considers how the research findings might have a considerable influence on the evolving knowledge across multi-disciplinary fields of research, practice and education.

Section 6.2 Key Findings of this Research and Contribution to Knowledge, summarises the key findings of this research, the original contribution, and the positioning of this research in relation to the context of others identified within Chapter 2.

Section 6.3 Reflection on the Research Study: Success and Limitations, reflects on the research process and outlines both the success and limitations of the study.

Section 6.4 Further Research Potential, suggests speculative recommendations for future research. Research findings from this study have started to pose new research themes and ask more questions regarding Way-finding Journeys. They provide new starting points for future studies.

Section 6.5 Reflective Post-Script, is where the Researcher reflects on the progression of the PhD study and the writing of the thesis.

Finally in **Section 6.6** this Chapter is summarised and the Thesis is concluded.

6.1 Significance, Relevance & Implications: Research, Practice & Education

This work has shed light on some areas which not only relate to Architecture and Design, but have implications for other areas of research, professional practice, education and stakeholders across many other fields [e.g. Health Care, Occupational Therapists, Orientation and Mobility Specialists, Psychologists, Building Managers, Qualitative Researchers, Technology Developers, Social Workers, and Sight-loss Charities to name a few].

It is hypothesised that other stakeholders will benefit from this research and through undertaking further research within their disciplines with their skill set, new perspectives and outcomes will add to the debate and dialogue established within this current study. The specific messages and implications in regard to *Research*, *Practice* and *Education* will now be considered.

Implication for Research

This study has established a unique method to explore experiences of 'real-life' (Robson, 2002) way-finding undertaken by real-life participants with a range of visual loss within the context of a real-life building. When investigating the 'domain of architectural research' (Groat and Wang, 2002,p. 19) the Researcher perceived a gap in the knowledge. There was a specific lack of a dominant post-positivistic methodology within architecture and so methodologies and methods were adopted from the realm of social research and then adapted to generate a new method appropriate to the discipline of architectural design.

Along with elements borrowed from established methodologies [Grounded Theory (Glaser, 1968) and the strategy of Case Study Analysis (Yin, 2003a;Yin, 2003b)], literature and practice informed the creation of Research Principles. From these guiding principles and through

iteration, a Way-finding Scenario composed of three Phases, undertaken by Participants with a range of visual ability was designed. Through continuous evolution this was the method used to explore the research phenomenon.

As a contribution to future research there are a number of possible implications for this research approach. Firstly, this exploratory research serves as a source of inspiration for the continuation of creative post-positivistic research methodology and methods within architecture and design. Secondly, this approach can be used as a foundation for future studies investigating way-finding by people who have other types and degrees of abilities/disabilities. Thirdly, it provides both a method to carry out further way-finding research through use of the Way-finding Scenario, as well as providing a hierarchical method of organising and presenting data produced: *The Experiential Charting of a Way-finding Journey.*

Fourthly, it can be used to study way-finding within other buildings and architectural contexts. These 'other contexts' could be transport hubs [such as airports and train stations], health care facilities [such as hospitals and medical centres] and leisure environments [such as shopping malls].

Fifthly, the Participant Profile data could be used by other Researchers or designers to gain insight into this group of people who have different forms of visual ability. The Participant Profiles from this study could form, or add to, a wider based Participant Bank of 'users' such as the 'user network' created by i-design project partners[1]. 'This approach seeks to give the designer a more holistic portrait of the individual than can be supplied by reading capability

[1] i-design project partners: Helen Hamlyn Centre for Design Royal College of Art, Engineering Design Centre University of Cambridge, The Well-being Institute University of Cambridge, Loughborough Design School University of Loughborough.

data alone' (i~design et al.). Sixthly, this study adds to the debate regarding the use of the Social Model of Disability (Oliver, 1990) and the Architectural Model of Disability (Goldsmith, 1997) within the realm of Design and Architecture.

Outcomes from all six research implications could potentially provide further valuable insights to the holistic design dialogue of way-finding experiences and way-finding design.

Implication for Practice

At the outset of this research, the primary target audience was practitioners within Architecture and Design. However, it is both timely and relevant research within the domain of many other disciplines. One of these supplementary areas is Orientation and Mobility training. These implications are now discussed below.

Architecture and Design

> 'Architects are key actors or agents in the production of the built environment and their conceptions of different user groups are important [...] in contributing to the content of design processes' (Imrie and Hall, 2001).

Current findings from this study add substantially to the understanding of how people with a range of visual ability and loss experience way-finding around a building. The approach adopted and the subsequent findings further two main arguments.

The First Argument: The importance of using the Social Model of Disability (Oliver, 1990) and the Architectural Model of Disability (Goldsmith, 1997) in Architecture and Design.

Generally in architecture, disability and impairment is thought of and defined under the Medical Model of Disability. This is demonstrated by building legislation which adopts and focuses on the medical model of disability to provide guidance to architects and instils a

'reductionist or impairment specific set of terms' (Imrie and Hall, 2001,p. 111). It shines the focus of a designer's attention onto the medical ideas or preconceived notions of what disability and impairment is and not onto the disabling and enabling elements of the built environment. In contrast, the findings from this research add to a growing body of literature which celebrates the use of the Social Model of Disability (Oliver, 1990) in design (Pullin, 2009) and the Architectural Model of Disability (Goldsmith, 1997) within architecture.

In adopting the Social Model of Disability, whereby Participants self-defined their experiences of way-finding with their visual abilities, the research has gained a rich insight into different perspectives of way-finding experience. The research would not have achieved this if the Medical Model of Disability had been adopted or simulations of eye conditions were used [as in Rousek et al., 2009].

This research has highlighted how fundamentally important it is that visual loss is not generalised. Each person's experience of way-finding with their visual ability is different and this highlights the individuality of a Way-finding Journey around a building. This study celebrates this individuality.

The present study provides additional evidence with respect to continuing dialogue in highlighting the importance and significance of using the social model of disability. In particular, this research contributes to Goldsmiths theory of an Architectural Model of Disability (Goldsmith, 1997) specifically regarding themes of way-finding and visual ability/loss.

The Second Argument: The concept that way-finding design is a vital element of architecture (Arthur and Passini, 1992). 'Way-finding design is [...] a principle. It is user orientated and

derives its approach and its interventions from the behavioural and psychological foundations of way-finding' (Arthur and Passini, 1992,p. 42).

For practising architects and designers, the understanding of Way-finding Journeys [and the recognition that designing to enable Way-finding Journeys is an important part of the design process] will aid in enabling way-finders to move through their buildings. Arthur and Passini state: 'way-finding, unlike signage, has more to it than graphic design' (1992,p. 17).

Design practice of way-finding will be the best testament of the - *Experiential Charting of a Way-finding Journey* - outcome of this study. The constant evolving nature of design will invent new strategies of dealing with Way-finding Hot-spots. Every designer will come up with different solutions and ideas. The Task Components and Communication Requirements could essentially become the 'mini-briefs' for designing Way-finding Journeys. The Communication Requirements provide the starting point for the design of way-finding interventions in current buildings and serve to fuel concept designs for Way-finding Journeys within new buildings.

The value of this knowledge to the architectural profession was highlighted during several presentations given by the Researcher to an audience comprising of educational experts, academics and architects (McIntyre, 2009;McIntyre, 2010a;McIntyre, 2011b;McIntyre, 2010c;McIntyre, 2010b;McIntyre et al., 2010a;McIntyre et al., 2009;McIntyre et al., 2010c;McIntyre et al., 2010d;McIntyre et al., 2010b;McIntyre et al., 2011;McIntyre, 2011a).

Orientation and Mobility Specialists

An interesting finding discussed within the Participant Profiles [Chapter 4], highlighted that not all people with substantial loss of visual ability have taken or will take part in Orientation and Mobility training. In this study, those who had taken part in orientation and mobility

training had only done so within the context of the external environment – not within a building. The importance of this finding is crucial to both the understanding of architectural professionals and commissioners of buildings, many of whom assume that all people with visual disability undertake this training and that it covers both internal and external environments.

This finding highlights a need for orientation and mobility training to also take place within the internal context of a building. A unique and novel outcome of this study is that *The Experiential Charting of a Way-finding Journey* could assist those who develop orientation and mobility training. It outlines the Task Components and Way-finders Questions which a person undertakes and asks during their Way-finding Journeys as they move through a building.

Implication for Education

This study has specific implications for architectural/design education at levels of undergraduate, post-graduate and continuing professional development [CPD]. Goldsmith (1997) states that issues relating to design and disability begin in the educational context of the design studio. He argues that training and education in disciplines of architecture and design do not relate to the requirements of people who have disabilities.

In response to this, one of the implications of the findings of this study was that the research outcome: *The Experiential Charting of a Way-finding Journey* could be [and was] used as a tool for creating dialogue between design tutors and students as well as amongst design practitioners in practice.

Based on personal experience of tutoring in the design studio of Dundee School of Architecture the Researcher was able to use The *Experiential Charting of a Way-finding*

Journey outcome of this research as part of an accessibility seminar with fourth year students who were studying for a BA honours degree (McIntyre, 2011a).

This enabled the Researcher to disseminate expertise, research findings and process into the design studio. A seminar and workshop, split into three sections, was organised as:

Section 1: Presentation, Questions and Setting the Scene for a Design Project.

The Researcher presented a lecture which was divided into two sections. Part one told the narrative of the Participant Profiles, while Part 2 concentrated on the Way-finding Hot-spots, Task Components and Communication Requirements evidenced by Way-finding Journeys.

Section 2: The Design Project: 'Thinking about Way-finding Your Building'.

The Researcher gave the students a design/analysis project which involved them assessing the Way-finding Journeys through their buildings. Whilst thinking about themes of: accessibility; impairment and disability; social model of disability (Oliver, 1990); the idea of architectural disablement (Goldsmith, 1997); and the Participants and their experiences of way-finding [from the presentation in Section 1]; students mind-mapped their buildings in terms of *Way-finding Hot-spots*. They highlighted potential positive and negative experiences way-finders with visual loss and other forms of disability could encounter when travelling around their buildings. Additionally, they began to think about how they would mitigate negatives and enhance the positives.

Section 3: Critique and Discussion.

Finally in small groups, students gave short presentations about their Way-finding Mind Maps to their peers and tutors.

Designing with impairment in mind is one of the many roles of the architect, a role that is often treated in a regulatory manner with guidelines and box ticking exercises. In this seminar the fourth year architecture students were given an introduction to real-life experiences of way-finding, undertaken by real-life participants with a range of abilities within the context of a real-life building. On reflection this was found to be a positive exercise as they each responded with further questions and debate about all aspects of ideas about disability and design.

This work-shop method of dissemination provides a possible solution to the question: *How can students/architects understand and design appropriately for how people with disabilities/impairment explore their buildings if they have never met anyone with a visual loss [or disability]?*

The outcome from this research could potentially add to resources in teaching inclusive design and accessibility in the undergraduate and post-graduate design studios of architecture, design and other related subjects.

Summary

The understanding and translating of Way-finding Journeys within theory and practical development should continue to evolve. It is recognised that the main end users of this work include *Researchers* from a range of disciplines [who will benefit from the methodology, methods and analysis] and *Practitioners* within design and architecture as well as in specialist areas such as orientation and mobility training etc. who will require the work to be configured in a different ways [e.g. as tools or strategies to use in design].

6.2 Key Findings of this Research and Contribution to Knowledge

The key findings of this research, the original contribution, and the positioning of this research in relation to the context of others identified within Chapter 2 are now considered within figure 6.1 [01 02 and 03].

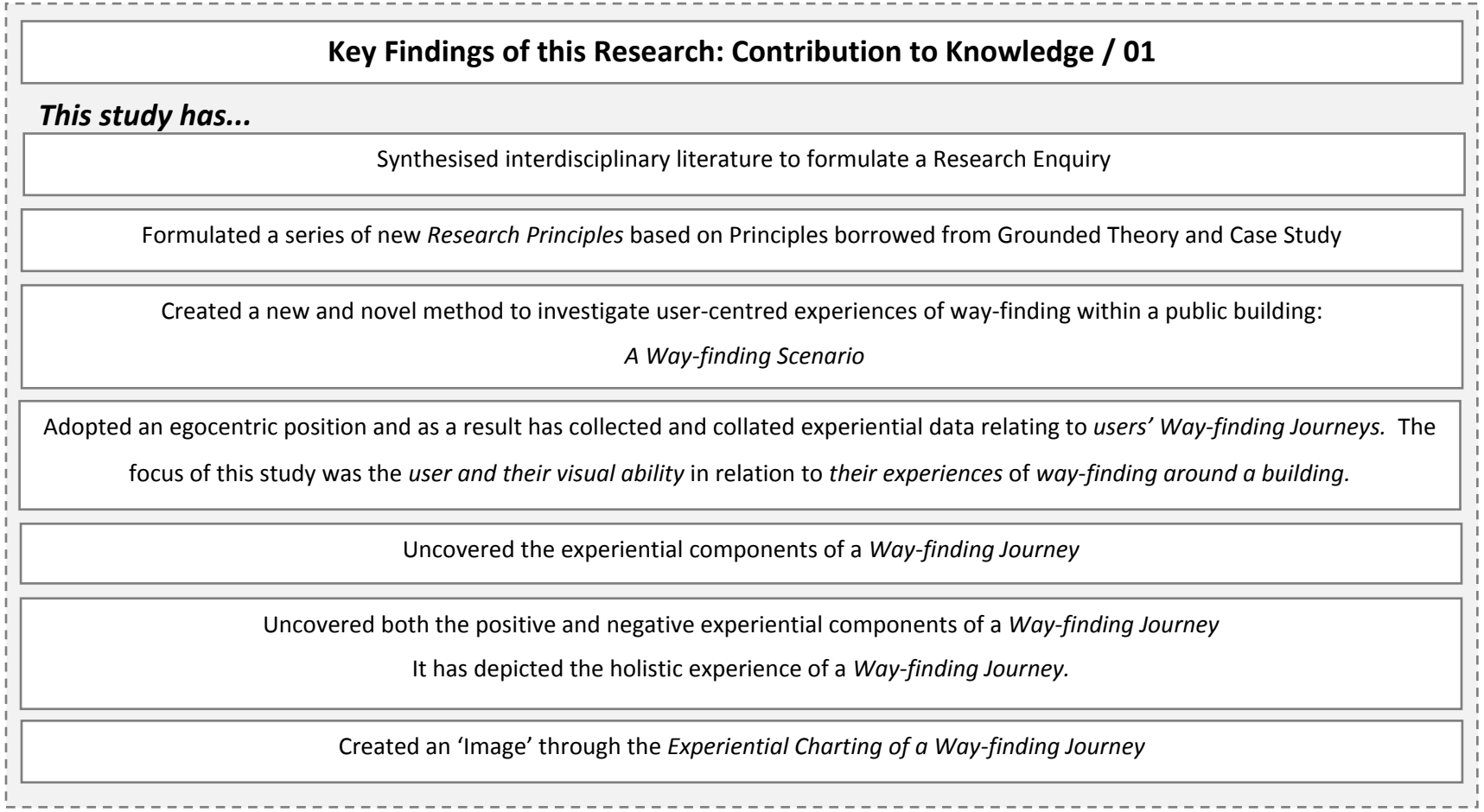


Figure 6.1: Key Findings of this Research: Contribution to Knowledge / 01

Key Findings of this Research: Contribution to Knowledge / 02

From the 'Image' of the Way-finding Journey, this study has evidenced that...

A *Way-finding Journey* is a fluid, continuous movement within a building which is composed of:

- Journey Stages: Approach, Entrance, En-Route Destination, Non-Specific and Destination
- A hierarchy of Task Components
- Communication Requirements - Way-finder's Questions

The dominant influence on the type of *Way-finding Journey* is dependent on what the way-finder wants to achieve.

Each *Way-finding Journey* is influenced by the way-finder's *Individual Approaches and Learning Styles*.

Each *Way-finding Journey* is Individual.

Lack of communication is the leading cause of major way-finding problems rather than the complexity of a building.

Way-finders need five types of *Communication Requirement*:

Identification, Orientation, Navigation, Warning and Instruction.

Figure 6.1: Key Findings of this Research: Contribution to Knowledge / 02

Key Findings of this Research: Contribution to Knowledge / 03

In terms of adding to the debate, expanding knowledge and positioning this work in relation to the work of others, this study supports and contributes...

to the development and use of Goldsmiths (1997) Architectural Model of Disability in specific relation to themes of: way-finding, buildings and architectural space, and disability [specifically in relation to visual ability and visual loss].

to highlighting the importance, development and use of user-centred research within architectural and design research.

to the argument that Arthur and Passini (1992) advance in relation to the theme of way-finding being accepted as a vitally important element of architecture and design.

the *Experiential Charting of a Way-finding Journey*. In addition to: Donald Appleyard's Coding Structures of the City (1970; 1969) [which can be traced to Lynch's work]; Network Structures, such as Space Syntax (Hillier, 2007) and IDEO's User Sequence Modelling (Myerson, 2001); and Architectural Structures, such as Arthur and Passini's Architectural Way-finding Communications (1992), Unwin's Basic Elements of Architecture (2000) and Ching's Basic Elements, Systems & Orders (1996), this study has provided a different way of thinking about elements of way-finding which are based on experiential narrative.

a response to findings put forward by Arthur and Passini who state 'the sighted population puts less effort into understanding settings in order to get around and this affects information giving' (Arthur and Passini, 1992,p. 66). This study provides a method for the sighted way-finder/designer to understand the communication needs and experience of way-finders will a lesser degree of visual ability.

Figure 6.1: Key Findings of this Research: Contribution to Knowledge / 03

Key Findings of this Research: Contribution to Knowledge / 04

In terms of adding to the debate, expanding knowledge and positioning this work in relation to the work of others, this study supports and contributes to previous research by...

adding to the work of Arthur and Passini (1992) and Barker (1995). This current research identifies the specific *positive* and *negative experiences* of a *way-finding journey around a building* which both fail and support people who have *varying degrees of visual loss.*

directly responding to Kitchin's (1997) finding that there is a lack of a way-finding model which incorporates all types of visual ability which is based on both experience and is in relation to a real-world setting. This research addresses each of these elements and presents a *real-life* study undertaken by *real-life* Participants with a range of visual ability. It is an evidence-based study of way-finding in a building based on an egocentric position.

presenting Participant Profiles based on real-life Participants to be used by other Researchers and Research Groups within different disciplines.

Figure 6.1: Key Findings of this Research: Contribution to Knowledge / 04

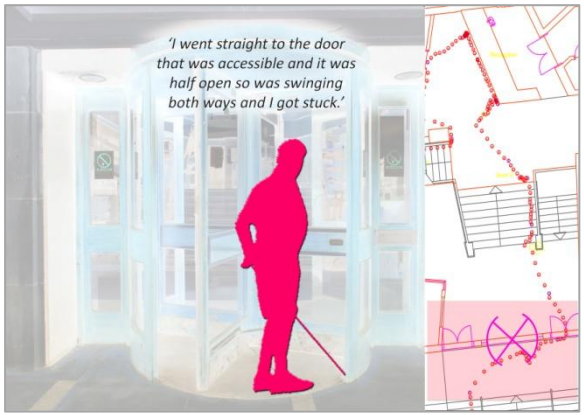


Figure 6.2: Example of a Participant's Way-finding Hot-spot

6.3 Reflection on the Research Study: Successes and Limitations

As with all research studies a period of reflection is now taken to consider the successes and limitations of the research. This is especially important if the research approach/findings of this study are to be developed further or applied within other contexts.

Successes of the Research

This study was successful on a number of levels. It identified a Research Problem, formulated an approach through Methodology and Methods, and in the end it answered the Research Questions. In the beginning, and after an intense review which outlined the research problem, a synthesis of literature drew together four reviews which were fundamental in focusing the research and forming the Research Question[s]. This synthesis of multi-disciplinary literature is something which is new.

In identifying a gap in current knowledge, a new research approach [specific to the fundamental elements of this study] was designed. This has successfully enabled the Researcher to gain insight into the way-finding experiences of people who have varying degrees of visual ability. Each of the Research Principles were found to be extremely important in guiding the research and provided the Researcher with a series of 'rules' to follow. The Way-finding Scenario, methods of data collection, transcribing and coding were successful and were found to present interesting and study-relevant data.

The creation of *The Experiential Charting of a Way-finding Journey* was found to be a successful way to organise, chart and disseminate the outcome of the research to third parties. In particular the simulation images used to present Participant's Way-finding Hot-spots [for example figure 6.2], were found to be vital in presenting [regardless of discipline] the narrative of Participant's Way-finding Hot-spots to multi-disciplinary audiences.

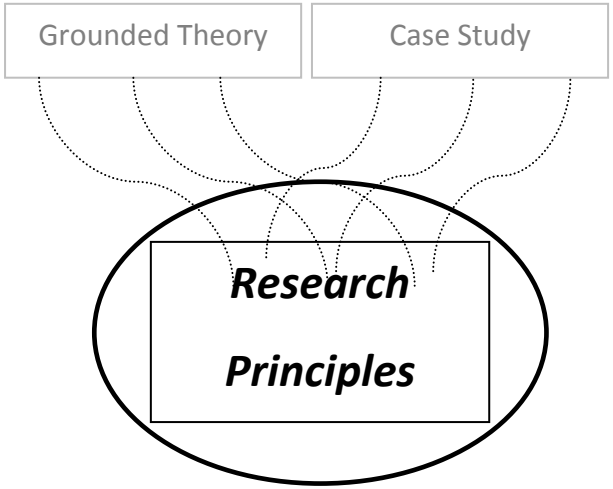


Figure 6.3: Formation of the Research Principles

Limitations in relation to Methodology and Design of the Research Enquiry

In designing the research approach [outlined in Chapter 3], elements from the established methodologies of Grounded Theory (Glaser, 1968) and Case Study (Yin, 2003a) [as a strategy (Robson, 2002,p. 179)] were borrowed to create the Research Principles [figure 6.3] Limitations were also inherited.

A limitation inherited from the principles adopted from Grounded Theory (Glaser, 1968) is outlined by Robson: 'It may be difficult in practice to decide when categories are saturated or when the theory is sufficiently developed' (Robson, 2002,p. 192).

As discussed in Chapter 3, Grounded Theory (Glaser, 1968) is vastly different from the more traditional line of enquiry where all data is firstly gathered and then all analysed. Instead the process was highly iterative and aspects of the study evolved as it progressed. However, this process of evolution and iteration could potentially go on forever. In this study the Researcher was faced with a role to project manage the PhD. The time and resources along with the objective to push towards an appropriate level of saturation had to be balanced.

A natural stopping point, but not complete saturation, was reached in this study. The Researcher has been able to uncover both the general and the specifics of way-finding experiences. Experiential data was plentiful and enough was gathered to analyse, code and build theory from. The analysis of data and the findings have opened up the problem, offered new insights into way-finding experiences, provided content for reflection and conveyed new opportunities for future research which is founded on this study.

Limitations in Relation to the Way-finding Scenario [The Setting and the Instructions]

The first limitation, in relation to the Participant briefing of the Way-finding Scenario, was that the participants knew that they would be undertaking a way-finding task and were prepared by the Researcher to do so. It needs to be acknowledged that this awareness would have made Participants more aware of their way-finding experiences [i.e. they knew the Researcher would want to talk about way-finding and so their minds were concentrated on way-finding].

There was however, no way of avoiding this as the Researcher wanted to ensure the participants had the information they needed and that the project always adhered to the study's ethical approval documentation.

The second limitation is that way-finders find it difficult to give an accurate account of their way-finding experiences (Arthur and Passini, 1992;Golledge, 1999). Although this Researcher took additional measures to dilute this [e.g. the methods used within Phase 2 and Phase 3], this is still a limitation which needs be acknowledged as not all of their way-finding experiences could be captured.

The third limitation, in relation to the way-finding instruction of Phase 2 [The Way-finding Task] was that the information given to the Participants before they carried out the way-finding task would have impacted and affected their actions.

The fourth limitation, inherited from Case Study Analysis (Yin, 2003a;Yin, 2003b), was that the findings evidenced from the Ten Way-finding Scenario Case Studies may not, in their entirety, be applied to other contexts. This is because each experience of a Way-finding Journey is unique to that person, in that time, in that setting.

The fifth limitation, in relation to Phase 2 of this study, were that the results were directly determined by the specific environment and to a certain degree need to be understood in connection to this. However during the period of evolving the Way-finding Scenarios this limitation was taken into consideration and Phase 1, and partly Phase 3, were designed to lessen this limitation and enable the study to explore other experiences of way-finding within other way-finding contexts. The Phase[s] of Purposeful Conversation (Burgess, 1982) enabled participants to talk, at length, about their way-finding experiences in other buildings. Therefore these other context way-finding experiences extended conceptualisation of a Way-finding Journey beyond the limits of just Phase 2 - the case study building. As these Phases concentrated on Participants' existing memories of Way-finding Journeys within many different settings this limitation was diluted. Through triangulating methods of data collection validity was enhanced.

The majority of findings can be generalised, for example: The Journey Stages – every visit to a building starts with a stage of Approach which continues to an Entrance which continues to a Destination [with also perhaps an En-route Destination of visiting the toilet] and there is always the Non-Specific experiences of way-finding such building elements of stairs, etc.

If future research is developed and further way-finding scenarios are carried out within the context of different buildings with more Participants, it is not unlikely that new Journey Stages will be categorised and it is very likely that new Task Components and Communication Requirements will be uncovered. These new discoveries will add to *The Experiential Charting of a Way-finding Journey* that this Researcher has created as well as continuing the evaluation of way-finding studies.

Limitation in relation to Scope, Sample and Empirical Data

Previous to carrying out the Way-finding Scenarios, preparations [outlined in Chapter 3] were made in advance of meeting the Participants. The Researcher attended user groups, sign-language classes, and ran pilots to fine tune various aspects of the Way-finding Scenario meetings. This aided in developing the Researcher's confidence in implementing and engaging Participants with the research study. However even with this preparation, several limitations in regard to: sample size, cultural diversity, time spent with Participants, data collection methods, transcribing, analysis, and way-finding setting, should be noted.

Although findings were interesting, plentiful and provided a range of way-finding experience – negative and positive – that could be analysed, the study was limited by a relatively small sample size of ten Participants. Participants varied in age, gender and visual loss but it is acknowledged that not all way-finding experiences are represented by this study. More Participants would provide data which could provide further insight. However in this study, time and resources were restricted. The sole Researcher working on this project would have found it difficult to have engaged with any more Participants. The sample size used enabled the Researcher to have time to gain control and consider the large volume of data [both when carrying out processes in transcribing and analysing conversations and way-finding trace]. Having another person assist would have been helpful, however because no one else was involved [as the data collector or scribe] trust between the Researcher and Participants was established and problems associated with continuity [of data collection] were not an issue.

Limitation in relation to Culturally Diverse Sample

The sample size was not culturally diverse. All Participants lived in Scotland. This meant that the sample was not as culturally diverse as it could have been if the Researcher had 'cast the net' into a wider audience. However again, there was a balance to be struck with the resources and time the Researcher had available. Although the cultural diversity was limited, the sample encompassed a varied group of different ages, visual ability, backgrounds and gender. Participants with a range of visual loss were purposefully selected as opposed to a specific type of visual loss. This was determined by the literature review which highlighted that concentrating design efforts on only the extreme challenges of visual loss is not 'desirable or possible' (Barker et al., 1995,p. 15). If cultural diversity was found to be an important aspect which impacted on this study then efforts would have been made to recruit a more culturally diverse set of participants.

Limitation in relation to Time

Each Way-finding Scenario was restricted by the time that was spent with Participants. In the Ethical Application [discussed within Chapter 3] it was proposed that the Participants' 'visit' would be for approximately eighty minutes. However a clause was also added to allow Participants to speak for longer if they wanted to expand on detail. Each Participant was also given the Researcher's contact details in case they had any further information to add. It is therefore the opinion of the Researcher that the time factor did not have a negative impact on the study.

Limitation in relation to Technology

The current investigation was limited by the use of technology. In the early stages of designing the Way-finding Scenario, time was spent investigating tracking technologies. The

Researcher was not able to find/ gain access to tracking technology which would gather and plot data of the way-finding trace. Instead this had to be done by the Researcher. Likewise the Researcher solely transcribed all conversations. If tracking technology/a transcription service had been available/used, then more time could have been spent with additional participants and analysis development.

Limitation in relation to Human Variables

The current study was unable to analyse all of the human variables impacting on way-finding experience. This study's focus was centred on way-finding experience and visual ability so age, gender and other human variables such as mood were not analysed. The empirical data was also limited as findings [Phase 2] were focused on experiences of a single Way-finding Journey and the ten Way-finding Journeys took place within one building setting of a particular use. The current research was not specifically designed to evaluate factors related to a specific type of building and so it is hypothesised that if carried out in another type of building both similar and new negatives and positives of way-finding would be identified.

Post Viva Reflection in relation to the adopted approach

The Researcher developed this study from an egocentric position which is fully explained within the Research Steps in Chapter 3 and Discussion Themes within Chapter 5. The use of this approach will now be reflected on.

The objective of this study was to focus on experiential, qualitative components of way-finding data provided by Participants who are the users - the way-finders - of the setting. Although this research has achieved this and rich data relating to the experiences of way-finding were captured and analysed, there are some instances when the use of an egocentric position has been diluted and the exocentric position sometimes relied on when undertaking

the documenting of this study. This is something which is a distinct lesson that the Researcher will be aware of when undertaking future user-centred projects.

When coding and developing the participant's descriptions and narrative into the Charting of the Way-finding Journey some of the egocentric-ness of the study was lost and replaced with a more exocentric termed paraphrase or coding. [e.g. if a participant described a sense of fear when they used a flight of stairs it was the building element [exocentric term] 'stairs' which was coded as opposed to the experience [egocentric term] of 'fear'. However there was often a clash between the use of the two positions as both the Researcher [as the Architectural Designer] and the Participant did seem to find it easier to speak about the building element first and the experience of using it second. As part of this it is acknowledged that emotions in relation to the use of building elements [stairs] were given more significance than just the emotion descriptors [fear]. The Participants also knew they were talking Architectural Researcher and it must be acknowledged that this will have influenced how they described their experiences [e.g. if they had been talking from someone from psychology or occupational therapy this would have impacted differently on the framing of their conversation].

The Experiential Charting of A Way-finding Journey which was the outcome of this study may, on first glance seem to be exocentric in nature [e.g. the use of doors, stairs etc.] however when delving further into the description of the Task and Communication Components Participant experience is obvious. This Model [or flow] of a Way-finding Journey was heavily influenced and definitely grew from an egocentric position. As a Researcher with a background in Architecture, it was natural that the findings of this research be discussed architecturally [i.e. emphasis on the experience of using the elements of architecture].

Therefore the Researcher acknowledges that in some instances these positions were combined to best illustrate and present the research.

6.4 Recommendations for Future Research

This Chapter has identified some of the implications of this research and these will now be summarised in this section along with speculative recommendations for further research.

The findings from this research study have started to open-up the research area. They have begun to establish the scope of the problem and challenges presented within this area of work. This thesis provides a starting point for further analysis and research into this field – in both extending the understanding of the field and also to initiate responses and solutions to the issues and scenarios identified. This is an exciting consequence and stimulates the beginnings of future way-finding research journeys with themes of: way-finding; experiences of buildings and visual loss/ ability. This research has thrown up many questions, themes and hypotheses for further investigation.

Further Way-finding Scenarios: Participants and Buildings

It would be interesting to explore way-finding experiences of individuals with other impairments and disabilities using the methods employed by this study. If the debate is to be moved forward, a continued development and understanding of the requirements and challenges presented by experiences of way-finding could continue to be developed.

Utilising the methods developed during, and employed by, this research to undertake future studies of way-finding within other building types could prove beneficial in the generation of data to further enhance an overall understanding of way-finding.

If the methods used in this study were applied to another building/type of building, it is hypothesised that further Way-finding Hot-spots, Task Components, Communication Requirements, Journey Stages and even types of way-finding could be uncovered.

Therefore questions become: *What other Way-finding Hot-spots would be uncovered? Would these Way-finding Hot-spots compliment the ones found in this research or would they be significantly different?*

New experiential data arising from these future investigations could be added to the *Experiential Charting of a Way-finding Journey.*

Guidelines, Regulations and Creativity in Design

This research has raised questions regarding: *What are useful guidelines for architects, designers and other stake holders?*

Considerably more work is required to establish the best method of conveying the findings to architects and designers to allow the most beneficial and accessible transfer of knowledge to occur. A further study could assess how regulatory guidelines are used and if they are appropriate to inspire creativity as well as providing the 'rules'.

Assessing the *Experiential Charting of a Way-finding Journey:* Orientation and Mobility Training

It would be interesting to explore orientation and mobility training which takes place within the context of a building using the *Experiential Charting of a Way-finding Journey* outcome from this research. Further research could assess and perhaps uncover further Task Components way-finders experience when learning how to get from A to B.

More broadly, research is needed to determine how other human variables impact on way-finding experiences and ability. The findings established by this research add substantially to the understanding of the experiences of a way-finder who has a visual loss. This research will serve as a base for future studies.

Developing Interventions: Each Designer will come up with Different Solutions

These research findings can be used to develop targeted interventions aimed at mitigating the problems and enhancing and utilising the positive experiences of way-finding which have been highlighted through this study.

The research has generated dialogue in the design of way-finding systems suitable for people who have varying visual ability whilst also addressing issues relating to a broader range of people, including those people who have other forms of disability, non-reading people, young children, older people, people with language barriers and many more.

On review of the scope of the findings and issues addressed within this thesis, it could be argued that Response Proposals emerging from this research would not be restricted in benefitting only those with a visual impairment. Rather, the research and evidence would suggest that the outcomes generated by this research would be of benefit to the wider population with regard to Way-finding Journeys within the built environment.

6.5 Reflective Post-Script: A Post-PhD Purposeful Conversation with Myself

Way-finding through this PhD, like a physical way-finding journey through a building, has been a rollercoaster. There have been many highs and lows and I have learned a lot through my training as a Researcher - far more than I am probably even aware of. There were specific moments, frustrations, hurdles and revelations which will now be reflected upon.

Throughout this PhD process there has been a lot of iteration, focusing and staggered progression [two steps forward and three steps backwards] as I have understood and advanced through the various research stages to answer my research questions. In the beginning, and when dealing with a broad-base of literature spanning across many disciplines, it was difficult to remain focused on material specific to the research themes. This was a frustrating yet really interesting period of study as I have stumbled across many other interesting gaps in knowledge, new ideas and various interesting practitioners, researchers and projects. Skills such as mind-mapping [as described within Chapter 3], drawing and creating simulations of participant narrative [as illustrated in Chapter 4] have aided understanding of the context of this study and provided me with the ability to test, formulate and present ideas. These tools provided many 'eureka' moments and enabled me to calmly work through the frustrating low points [when I didn't know what to do next]. They provided me with the ability to write and explain the evolution of my research and specific elements of my thinking.

Within the contextual review [presented as four reviews] there were many revelatory moments as I negotiated through different types of literature. It was extremely challenging to structure and convey the context of such a diverse and vast collection of literature

surveyed from a variety of disciplines and forums. The initial goal, within the first review, was to understand the field and its complexities before working to focus the search in the form of three specific reviews depicting: Visual loss, Way-finding and Design Approaches to assist/ enhance way-finding. This first review was crucial as it enabled me to generally survey the field, to both skim and delve into crucial texts, familiarise myself with terminology, understand the research themes and map the current gap in the knowledge. Within the thesis this Review provided an overall introduction and synthesis of the field.

When trying to depict the nature of visual loss in terms of definition and what is known about experience of living with visual loss, the study developed alongside understanding of the different theoretical models and terminology of disability. The key Models of Disability [Medical Model and Social Model] were assessed, understood and critiqued and simulations of visual loss began to give insight into defining the nature of visual loss. However coming across Goldsmith's (1997) Architectural Model of Disability was a revelation which inspired and motivated me towards positioning and developing my work within the context of architecture.

Understanding the various way-finding models and coding structures of way-finding was both an interesting and demanding period and took the study into realms of Geography, Urban Design, Cognitive Psychology (Downs and Stea, 1973), Anthropology, Phenomenology and Ecology (Ingold, 2000), Architecture and Design (Arthur and Passini, 1992), Psychology and Rehabilitation (Hersh and Johnson, 2008) and Computer Science (Harper and Green, 2000). Working through these models of way-finding was demanding and the use of illustrations and diagrams helped me understand various concepts prior to analysis and presentation. It was extremely important to build this knowledge base in relation to way-finding before advancing this study.

When reviewing the various Way-finding Environments and Way-finding Interventions within Review 4 I was suddenly aware of a lack of connection between building regulations/ legislation and users of buildings, egocentric positions and the social and architectural model of disability. This was when I first realised that legislation, building regulation etc. would not have a huge role to play in this thesis. Instead of a limitation, I believe this to be one of the major strengths of this work. I was not trying to create an accessibility audit of buildings – I was coming from an egocentric position and therefore as an architectural designer was always interested in what could be learned from Way-finders experiences [positive and negative] of way-finding through a building.

The design and selection of Methodology and Methods was an extremely challenging process and a steep learning curve ensued in overcoming methodological challenges. The revelation came when I decided to create the Research Principles as the Methodological drivers to both form the foundations and structure the progression of this research. These were the 'rules' of my research and in addition to their development it was equally important to reflect on their use and how they were achieved. This is specifically written about in Chapter 3.

The Way-finding Scenario days were the times when I absolutely loved going to work. The most inspiring aspect of this whole PhD process was working with the Participants. Their experiences of way-finding [captured by Phase 1: Way-finding Conversation, Phase 2: Way-finding Task and Phase 3: Post-Way-finding Task Conversation] were extremely interesting and I feel that by listening to their stories and understanding their Way-finding Hot-spots this study has advanced further than I could have ever imagined it would.

After every Way-finding Scenario Day each Participant's data was transcribed. As a sole Researcher this was extremely draining and took longer than was first anticipated as every

word [from conversation] and every second in time [from the way-finding task] was transcribed/plotted by the Researcher. This was however, a fantastic way of engaging with the data and developing the analysis coding as so was time well spent.

The analysis of the raw data was probably the most demanding and intense period of the study. The skill of mind mapping enabled me to quickly test codes from one participant to the next and enabled analysis of commonalities and differences. The developing of the Way-finding Journey was a break-through moment which enabled me to structure and present narrative of the Participant's rich experiential data. As soon as the experiences of the way-finding journeys were charted discussion themes began to arise. It is within Chapter 5 [and partly Chapter 6] that these are discussed and the advancement of new knowledge in relation to the Reviews within the contextual field is demonstrated. This writing enabled me to holistically consider what and how this study contributed to knowledge.

Coming from a visually based discipline it was both frustrating and rewarding as I tried to find my writing voice. The structuring and telling of this research story has been extremely demanding and I have probably written ten times more words, mind mapped over hundreds of pieces of paper, drawn lots more diagrams and created more participant narrative illustrations than are held on the pages of this final copy.

This research has changed me as a Designer, Researcher, Writer, and as a Visitor to buildings. I am even more obsessed with my research themes [as well as new ideas] and can no longer walk around buildings without pointing out potential way-finding hot-spots.

6.6 Chapter Summary and Thesis Conclusion

This, the final Chapter in the Thesis is where the Researcher has been able to reflect on her experiences of the PhD.

Implications for the evolving of knowledge development across research, practice and education have been demonstrated. Limitations of scope, methodology and empirical data have been acknowledged and recommendations for further research have been discussed.

Starting out on a quest just over three years ago, the Researcher became extremely interested [obsessed!!] in two major things: [1] *Experience of Way-finding in public buildings,* by [2] People who have a *Range of Visual Ability*. These Research Themes fuelled this research study. Through use of an innovative approach a new theory – *The Experiential Charting of a Way-finding Journey* - has been uncovered, analysed and presented.

This research begins to generate dialogue in the design of systems suitable for a diverse range of way-finders. It provides the tools for application of this knowledge in professional practice across disciplines of architecture and design as well as in areas of the medical profession, rehabilitation, policy making and academia.

Future research themes and questions, reviews of literature and creative use of method will further explore the phenomenon of way-finding within the context of a building.

With comprehension of a Way-finding Journey, design considerations can contribute to the safety, wellbeing, independence and joy of visitors who have visual impairment and benefit those who have sensorial or cognitive impairment, other types of disability, the young, elderly, people with language barriers and many more.

This study has started to provide a research-based foundation to open the problem area and provide an insight into the issues - the positive and negative experiences - people with different visual abilities encounter as they undertake a Way-finding Journey within a building.

‘”Begin at the beginning,”

the King said gravely,

“and go on till you come to the end: then stop.”’

(Carroll and Tenniel, 1992,p. 143)

This is the quote which was first introduced this thesis and on reflection I feel that I have come to ***An*** end but not ***The*** end of my Researching Journey.

‘The value of an idea lies in the using of it.’

[Thomas Alva Edison 1847-1931]

This research has answered the questions it set out to explore, however it has also started to ask more and more questions which could not have been envisaged in the beginning. With the advantage of what I now know, the future objective will be to begin work to answer these new questions to generate potential solutions in relation to findings.

This study has generated a great deal of new knowledge, not only for wider design and interdisciplinary communities but also for myself as a Researcher. My greatest hope is that I can build on this foundation.

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Appendix Files

[A-G]

Appendix File Contents

Appendix A

Way-finding Day Checklist & Debriefing

Way-finding Day Checklist and Debriefing

---Pre -Way-finding Day --- Way-finding Day --- Post-Way-finding Day---

Previous to Way-finding Scenarios

- Advertisements
- General reply to initial emails of interest
- Make contact with the Participant to;
    - Create the Information Pack.
    - What format would the participants like to receive the Participant Information Sheet and Consent Form?
        - (Braille, Large text format, email etc).
        - Information required – email/postal address.
    - These forms will be transcribed into the desired format and sent to each person.
    - Suggestion of date/time/place
    - The pack will also include directions to the meeting place on the day.
    - The Participants Questions will be answered
    - The Information Pack will be sent to the Participant – email/post.

Readers Note: It should be understood that these plans, prompts and questions are the Researcher's notes which were utilised throughout the phases of the Way-finding Scenario. Not all of these questions were asked and they were not always asked in the way they are recorded in this Appendix.

The Way-finding Day

Location: Quite Cafe - Thank participant for taking part & Introductions.

Explain to the Participant that: This research hopes to explore the real needs and problems a person with different types of visual ability encounters whilst finding their way through a public building.

The researcher is Miss Lesley McIntyre from the School of Architecture, University of Dundee, she is being supervised by; Graeme Hutton Jeanette Paul and; Professor Jennifer Harris, University of Dundee.

This study will involve you undertaking a way-finding task within a public building. First, we will have an initial general chat mainly about way-finding you're your past experiences. Second, you have been given a starting location and a destination point within a public building that is deemed to fulfil building regulations and is of an adequate and safe nature. You will be asked to travel and find your way to arrive at the destination where the researcher will meet you and will answer any questions that you might have.

Lastly, if it is still ok with you, we will have another chat over a cup of tea and some cakes and I will answer any questions you might have. Do you have any questions at this point?

You can decide not to take part at any time and we can stop and just have a cup of tea and a piece of cake. If you decide that you don't want your data to be used then you just have to say so and it will be deleted. [Even if you decide after today] Do you still want to take part?

'To do' List – The Briefing

Participant to Sign the Consent Form [Use signature guide]

The Participant can take the Information Sheet for their information.

State that my contact details are enclosed.

If they have any questions a couple of days…weeks…months… after the *Way-finding Scenario* then they can get in contact.

Phase 1: *Conversation with a Purpose*

Refreshment: First – Offer and buy tea/coffee/cakes etc.

Explain – Wee chat about your experiences of way-finding in buildings.

Let's just have a general chat mainly about your experiences of way-finding. I will record our chat with a Dictaphone so that I can listen over our conversation again. I will be the only one to listen to these recordings. If you don't want to answer any of my questions or you want to stop at anytime just say and we will be finished.

Line of Purposeful Questioning & Conversation Topics

1. Participant Information and General Information

- Participant Details: including general detail such as name, age, occupation etc.
- Self -Definition of Visual Ability: including detail about their visual loss.
- Way-finding Aid: including detail about general way-finding experience.
- Preferred Information Format: Braille, large text format, audio etc.
- Orientation and Mobility Training: including detail about education relating to orientation and mobility and these experiences.
- Anecdotes: including stories of their experiences [not just in relation to way-finding].
- *How would you describe your visual ability?*
- *When did it come about?*

1. **Training, Techniques and Technologies**

- Orientation and Mobility Training, Aids etc.
- Have you have/taken part in any type of orientation and mobility training? Did you learn skills at School to help you with orientation/mobility….do you still take part in such training? In what context did this training take place? Did it happen in a building or in the urban environment or both?
- Do you use an aid to help you to orientate and navigate throughout the environment?
- What Aid do you use? Low tech / high tech.
- Can you tell me why you favour this aid?
- Have you found that you have developed any personal techniques or tricks that you use to enable you to find your way? Maybe skills that weren't taught but you have learned enable you to find something out about your surroundings?

2. **<u>Way-finding in buildings other than dwellings</u>**

- When visiting a building for the first time do you visit independently?
- How do you feel when you are way-finding in a building? Positive/Negative Experiences
- Do you ever have problems with way-finding in a building?
- If you come into a building for the first time, by yourself, how do you go about trying to find the information you need to tell you about where you want to go?

- **Approach to the Building**
- Can you tell me about your experiences of approaching the entrance to a building? [what about crossing car-parks [multi-use areas] in front of buildings?]
- How are you able to know that you are firstly in the correct building?
- What is the first thing you do when you enter a building
- Do you use directional advice?
- Do you immediately use the receptionist for information? Do you have someone else with you? Do you find the receptionist easily?
- Do you ever use signage? Do you ever find some types of signage useful?
- Does it ever happen that you cannot find the information that you need to find your way in a building? How does this make you feel?
- How do you generally find travelling around buildings, can you usually find the places where you want to travel too? Can you always get to where you want to go?

- Have you ever had an accident in a building?
- Ever been in a building where you have been able to find your way about without any difficulties or any problems?
- Is there and area in a building where you can usually get the information that you need to find your way?
- How do you cope/ ever been in a situation where there is perhaps long corridors and doors leading off the corridor – would you walk to the end of the corridor – even though you weren't sure that it was taking you to the destination point?
- Vertical circulation – what do you favour? Why?
- Light conditions – prefer brightly lit/ dull light/ artificial light/ natural light – does your eyesight need time to recover when coming out of brightly/ dimly lit space?
- When you don't know where to go – what do you do?
- Do you ever feel that you are lost in a building - how does that make you feel?
- What helps you to find your way around an unfamiliar building?
- Do you find that signage –helps you to find your way? – Colours, text, colours etc

- Are you able to detect/ know you have reached the destination point when you have come to the end of a way-finding task? A-B?
- Do you/ are you aware of Braille in buildings? Can you read Braille?
- Handrails on stairs – help you get up and down – mark out the stair – beginning/ end? Gradient etc – does your cane/ aid help with stairs?
- Can you figure out distances in a building- how far away something is?
- Can you always find your way to the toilet – decipher between male/ female
- Do you find that you can associate areas together? – colours signs etc.
- Do you ever ask people for directions? How do you find these directions? Can you use these directions and apply them within the context of your surroundings?
- Do you just ask anyone – or does the person have to belong to that building – e.g. – security guard/ receptionist/ worker as opposed to a random person walking by?
- Have you ever had someone ignore you when you are asking for directions or have they tried to avoid/get you to speak to someone else?
- Do you find that you get worked up – or stressed when way-finding? Have you ever been late when trying to find your way?
- Ever had a feeling of not ever being able to get to a destination point?
- Ever walk into things – have accidents, bump into things that shouldn't be there e.g. temp. exhibitions, misplaced bins etc. Ever not been able to get to your destination point?

3. <u>Environmental Inputs// Sensorial Cues – Collecting Information to Way-Find By</u>

- Do you use noise/audio clues when you are in a building?
- Do you use smells, textures etc. Is it useful if you can detect floor changes?
- Can you avoid obstacles within the environment?
- How well does your sight cope with fluctuating light conditions indoors/outdoors?

4. Finding and Following a Route Through: Building Layout/ Volume/ Spatial Distance/ Corridors

- How do you learn and remember the layout of an unfamiliar building?
- How important is your memory when undertaking a task of way-finding?
- How do you try to familiarise yourself with a new environment?
- What do you do when you need help – become lost in a building?
- Have you ever been hurt or injured as you have way-found around a building?
- Can you think of anything now off the top of your head - any major difficulties/ issues you have when you are way-finding?
- Has there been a specific building or set of rooms where you have struggled to find your way
- Have you ever found some element in a building that has enabled you to find your way with confidence and ease?
- Using Public Spaces/Avoiding Private Spaces

1. **Becoming Lost**

- Have you ever become lost in a building?
- When you became lost, how did that make you feel? How did it affect your confidence in finding your way?
- Do you ever ask directions?
- Can you think of anything else that frustrates you about buildings?
- Can you think of anything you love about being in buildings?
- What do you think could be done to make your way-finding easier and more enjoyable?
- Have you ever just given up and just left the building – or felt that you wanted to?
- How do you get out of the 'lost' state?
- Do you ask people for directions?

Phase 2: *The Way-finding Scenario*

Simulated Way-finding Task Instructions

You are attending a meeting

You have arrived early and have plenty time to find your way there

You should way-find as normally would when in this situation

If you use an aid, then feel free to use it throughout during the task.

If you ask for directions, then feel free to ask for directions.

If you normally take someone with you then take someone with you.

You have my mobile number if you need me/want me to find you/ want to stop at anytime.

Recording the Information

When undertaking the way-finding scenario - You are being asked to use video camera to record your way-finding. I will give you my mobile phone number and if you want to stop phone and I will come and find you.

If the agreed time spent on the way-finding scenario takes longer than originally thought, the participant will be approached and given the choice of whether or not to keep going or to stop. I f they decide to stop, they will then be taken, debriefed and offered refreshments.

Phase 3: *Conversation with a Purpose* [Post-Way-finding Task]

Collecting the video camera –offering refreshments and checking that the Participant is ok

Another chat - Picking up on discussion points as in Phase 1

Approach

Arrival and Threshold

Finding the Correct Site

Entering the Site via an Appropriate Threshold

Crossing the Site: Getting to the Point of Entrance

Finding and Following an External Approach Route

Communicating with Multi-Use Approach Users

Accessing a Path

Avoiding and Dealing with Approach Hazards

Entrance

Using an Appropriate Entrance Threshold

Using Types of Entrance Doors

Double Sets of Doors//Automatic Sliding Doors//Glass Door//Revolving Doors

Being Welcomed

Forming a Strategy to get Around the Building

Using a First Form of Directional Information

Using Entrance Staff

Using Entrance Signage

Pre-prepared Information

En-Route Destination

Making Discoveries and Having a Rest

Using the Toilets/ Finding the Toilets

Finding the Disabled Toilet

Distinguishing between Male and Female Toilets

Using the Bathroom/Toilet/ Fixtures and Fittings

Exiting the building in an Emergency: Knowing what to do

Non-Specific

Finding and Following a Route through the Journey

Finding and Following a Route Through: Building Layout

Understanding when Layouts Change

Finding and Following a Route Through: Volume

Finding and Following a Route Through: Spatial Depth/Distance

Finding and Following a Route Through: Corridors

Using Public Spaces/Avoiding Private Spaces

Dealing with being Lost or Disorientated

Going Through a Door

Negotiating a Change in Level

Avoiding and Dealing with Hazards

Collecting Information to Way-Find By

Destination

Identify the Destination floor/area/zone

Finding the Destination within this floor/area/zone

Identifying and Stopping at the Destination

Debriefing: Making sure the Participants are in the same state of mind they were in when they arrived.

Give contact details in case the person wants to get in touch - if they want to withdraw their data. Debriefing takes place in the PhD base on the conclusion of each way-finding scenario. This will give the researcher the chance to reiterate the main factors about the investigation; state that participation is voluntary and the visitor can withdraw their information/data without any penalty and for any reason at anytime. The debriefing session will include an informal discussion which will further gather information about the way-finding difficulties and needs.

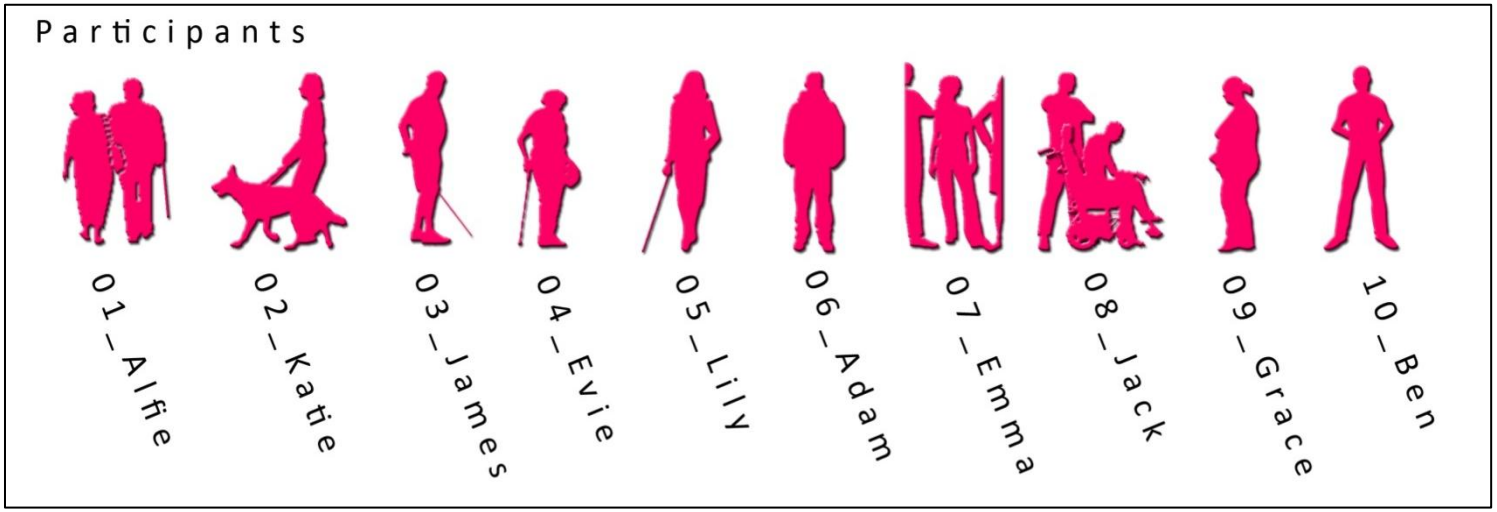
The researcher will ask if the participant has any questions and will state that participation may stopped and withdrawn at any time throughout the study without explanation and that the data that is provided may also be withdrawn if desired.

Permission will be asked to use the verbally recorded/visually recorded data that is supplied throughout the way-finding scenario. Relevant measures will be taken to ensure that the participants and others identities are protected. The participant will be told that they may stop being part of the research study at any time without expectation.

Appendix B

Participant Profiles & Summary

Contents:



01 Alfie's Profile:

Name: Alfie
Age: 60-70 years old
Sex: Male

Occupation:
Volunteer at local radio station
Talking Newspaper Reporter

Mobility / Orientation Aids:

I carry a white stick so people know that I am blind and I can use it to hit off things as I am walking to make sure nothing gets in my way...I am always with a sighted person anyway.

Hobbies:
Talking Newspaper
D.J on local radio station
Keen Fisherman

Braille Reader: No

I can't read Braille. Just because I am blind it doesn't mean that I have been given some skill to read Braille - a lot of people think that I can just 'cause I am blind.

Alfie's definition of his Visual Ability:

I see in complete blackness. I am in total darkness all the time. I can't see the difference between light and dark.

I can see nothing.

It was age that did it, macular liquid. Lost it completely when I was about 55.

I have been really short sighted since birth and my eye is three times bigger than what it should be so the retina is bigger than it should be.

I had detached retinas, but I got my sight back after an operation. But the jelly in the retina just changed with age...it didn't hurt at all. One day I could see fine and then the next day I saw a wavy line with red at the bottom and the next day it was all just black.

The jelly in my eye was changing and I had to look through it. It was a weird transition period from going from this to then being in complete darkness. I think my mum had the same condition as me and we had the same eye specialist.

The only way I can explain it is that my mum used to say that she could see wee cars and big cars - all because of this liquid jelly stuff. I couldn't understand it until it started happening to me and when my wife was driving along I could see the cars that were on the other carriage-way coming towards me and they were normal sized when they were a certain distance away but when they got closer they became really big. It was as if they were coming onto our part of the road. The jelly was changing the normal image. It was changing everything around the wrong way.

Alfie's Way-finding:

When people are talking to me and telling me what is going on it is all right. It is the same with a building - I can't see anything, so the way things communicate to me has to be different than the signs that are up.

I always have someone else with me all the time when I leave the house. My garden is the only place I will go to by myself.

Alfie's Story:

I am a Granddad and the kids tell their friends 'my Grandad eyes are brokened'...The kids are great..I have seen two of them, but I haven't seen the other two.

Before I was blind I knew nothing about this world...
I remember when I was young I was watching a film with my dad and I was asking him why the man had a white stick and why was he hitting the buildings with it, and my dad just said - oh that man is blind he can't see and he is using that stick to find his way about...and that was all I knew.

I thought that white stick was some kind of magic wand that let that man get about all by himself. That was all I knew about this world before I was in it. I just had no knowledge of what it would be like.

Orientation and Mobility Training: No

Normally someone guides me. I always have the person on my left. I prefer having someone with me when I am walking about. If I was by myself I would panic.

Sometimes when my wife is working and I have to get to the radio station I would phone the taxi and just ask that he came up and help me out to the car. I would never know where to go to by myself.

02 Katie's Profile:

Easy little messages around buildings would help. Things that I can figure out would be great and very helpful, especially when it's just me and Bruno walking around by ourselves.

Name: Katie
Age: 40-50 years old
Sex: Female

Occupation:
Legal Service Civil Servant
Solicitor (Pre-Sight-Loss)

Mobility / Orientation Aids:

Guide-Dog 'Bruno'. Me and Bruno travel all over the country nearly every day of the week. I have to use a Cane if Bruno is ill.

Hobbies:
Travelling
Meeting with friends
Listening to audio books
Shopping

Braille Reader: Yes

I can read Braille, not brilliantly, and its not my preferred form. I am not very fast at it. There is often the assumption that if you are blind then that means that you can read Braille.

Katie's definition of her Visual Ability:

I used to be able to see. I lost my sight 25 years ago, and I am now totally blind. I have some sense of shadows, but nothing that is at all useful. I can't see a shadow and think 'oh I need to avoid that area'. I have no useful sight at all when I am out and about.

My sight-loss came about because my mother contracted a virus just before I was born, it passed onto me and then genetically onto my children.

I lost my sight when I was 21, so I know what things look like and I know what colours are. I remember my vision, the grass is green and I know what green is.

Katie's Way-finding:

I am a well travelled person because of my work, and I have worked in the public sector for 27 years. I have had more of my fair share of experience of public buildings in local government and civil service.

My mobility in my home is just me memorising and using my sense of sound and I use a guide dog to get around outside. I am a very competent person at being able to get out and about but I am not confident with a white stick.

I can only sense things through sound and touch really when I am way-finding around a building. If you can't touch the edges of an open space, you have to use hearing. But if you can't hear the echoes back from the building line - either because of the other noises, the number of people in it, or because the building line is so far away -then you can't use it and it is a really vulnerable feeling.
I can't tell you how vulnerable you feel when you can't use either sound or touch.

Katie's Story:

When I was a sighted person, the information I took in was all the visual information. I never really paid all that much attention to the hearing or the rest because I never really needed it.

When you are blind or partially sighted you memorise. When you have been to a building for the first time you commit certain information to memory. Because I used to be able to see, I quite often memorise things visually so I can remember layouts of roads or certain parts of buildings. I mean you try to not fill your mind with rubbish, but things you need to know. So I try to figure things out in my head visually in a sort of map style .

I try to remember certain bits of information like 'oh that is where the carpet starts so I must be at that point'.
But it might not be a visual thing sometimes, it could be a tactile image, but mostly for me it is a visual thing because I used to be able to see. So if you described something to me, if it had some sort of pattern to it I could understand and start to visualise it. But if it is higgledy-piggledy then how would someone be able to explain that and how would I be able to translate that in my mind and visualise it?

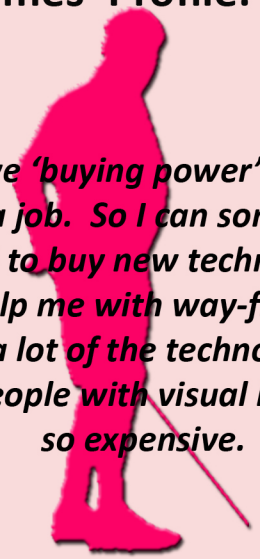
Orientation and Mobility Training:

I was trained with the long cane about 10 years ago but I just didn't feel comfortable with it. You have to use the cane about a foot in front of you to check if there are holes or dropped kerbs or stairs and I just didn't feel safe enough. I kept tripping up over the bloody thing. It just didn't suit me and didn't make me feel that comfortable and I'd walk a lot slower.

The idea was that I would be able to use the cane if the dog was retired or was ill or whatever. I feel much more confident with the dog and travel all over Scotland because of my job .

Bear in mind the dog is only trained to walk in straight lines and sit at steps and kerbs. I mean all the dog is doing is stopping me from bumping into things or people, but at the end of the day I still have to make the decisions about whether I need to go straight ahead or left or right or whatever - I need to know where I am going.

03 James' Profile:



I have 'buying power' cause I have a job. So I can sometimes afford to buy new technologies to help me with way-finding. But a lot of the technologies for people with visual loss are so expensive.

Name: James
Age: 50-60 years old
Sex: Male

Occupation:
Self-employed

Mobility/Orientation Aids:

I use a roller tip cane now. I like it because it is bigger and can feel out what is all around. The roller tip is in contact with the ground all the time. With the tapping cane you are just getting the extremes, but roller canes give you better information about the ground surfaces and the bigger the tip the more information you can get. You can feel the whole surface area on the ground.

Hobbies:
Musician
Music
Socialising

Braille Reader: Yes

I learned Braille from aged 5. I started in a primary class when I was at the Royal Blind School.

James' definition of his Visual Ability:

I have been blind since birth and am registered blind. My sight has stayed the same as it always was. I can see more than dark and light, I can see colour contrast kind-of, I suppose. I can see that my cup is lighter than this table and that my shirt is even lighter still.

I have a very small amount of sight, I don't know what percentage. It depends on how tired I am, where I am, how much attention I am paying to what is going on around me, on the light, what I am doing. It just depends. I have some useful vision in terms of getting around.

James' Way-finding:

If I am paying attention I can avoid bumping into lampposts and I can tell the differences between the door and the wall if there is decent colour contrast.

But I need the cane, it is more than just a backup to this stuff. I would never leave without it because I do miss stuff at times.

Getting around as a blind person is tiring, I mean you are switched on all the time, I don't think people keep in mind how trying it is - you are paying attention all the time to what you are doing in a way that sighted people probably aren't.

One size doesn't fit all in terms of blind people. I have really good orientation and mobility skills and I have a lot of confidence and I think that just comes from good awareness and ability which has come from practice. So I probably do things now that I just do cause I have learned to adapt - things that I have picked up help to keep me safe.

I do like to have someone else with me....a sighted person.

James' Story:

I am not prepared to sit about and not do things. I just get on and do it. I don't want to suggest that I am some 'super-crip' or anything. It's just the way I am and just the way I have been brought up.

On top of our impairments, there are barriers to use and access services. We just can't get in to a building, or use the bank machine, or see the system of queues or access whatever is going on.

Orientation and Mobility Training: Yes

I think I am pretty good in terms of being mobile and navigating about. I got about OK and was pretty mobile by myself when I was younger. I had formal mobility lessons when I was in my teens just so I was safe moving about and stuff when I was outside.

We used the long cane. We did have the tappy canes, but they are all roller tips now. I did have some classes, the O&M teachers taught us how to stay safe and we had training in using the long cane.

The cane is particularly useful for things like dropped kerbs and finding the knobbly bits at traffic lights and all that stuff. It is good at finding the markers. It's much better with that kind of stuff. I am not a very doggie person so I wouldn't have a guide dog. They work for some folk and some people wouldn't be without it, but it's not really for me.

I hated mobility lessons: just the idea that someone would be following behind and watching what we did... I didn't like that.

I am just so glad that I can do both of them and generally speaking I can feel safe when I am travelling about. I don't always know where I am or where I am going, like if I get lost or whatever, but generally speaking I work on the basis where I can always keep myself safe by using my cane properly and my other mobility skills. Then I work a way out of it.

04 Evie's Profile:

I am really looking forward to getting my guide dog.

Name: Evie
Age: 60-70 years old
Sex: Female

Occupation:

I am originally from New Zealand where I worked as a teacher and then later as a chef. I have travelled all over the world as a chef.

Mobility / Orientation Aids:

I am getting a Guide dog and am taking part in more training.
At the minute I use a cane.

Hobbies:

Travelling (locally)
Meeting with her friends for coffee

Braille Reader: No

I can't read big print anymore.

Evie's definition of her Visual Ability:

I have high photo-phobia. I only have peripheral vision. I have macular degeneration, I have retinal detachment and diplopia. Which is double vision.

The first experience I had that something was going wrong with my sight was an extreme intolerance to light. I was finding that when I got caught by a bright light it takes away my vision completely. I only noticed something was wrong when I was about 50 years old.

It's what the optician calls 'bleaching out'. It will eventually come back and what happens is that the colour will start to break up and I will start to see bits in between, but increasingly now it breaks up and I can see bits around the sides more than anything in the middle.

That is why I wear these peculiar tinted glasses which I sometimes wear over other glasses as well. It can have quite an extreme bearing on me in entrances of places where they light them up, and ladies toilets where they are brightly lit with spot lights, there are often different spot lights which are directed against mirrors and I seems to reflect back onto my face.

Halogen bulbs too are awful and are full of iridescent colours, they are really bright, quite beautiful, but distracting. I wear corrective glasses which take tones and colours away which aren't really all that helpful anyway.

I sometimes see lights as halos of light, you know when people say 'it's doing my head in' well coming into brightly lit places I explain it as 'Doing my eyes in' It takes ages for my eyesight to recover.
Red is one of the only real colours that I can see.

Evie's Way-finding:

I use my remaining sight and colour is definitely useful for me.

I have come through shopping centres, but I wouldn't really venture out into other areas of streets or even other big places that I don't know if I am by myself.

I have to use landmarks and buildings to way-find in the streets; I would probably do the same in buildings if there were such things like landmarks.

Evie's Story:

I have travelled all over the world having adventures but then I came to live here - I was seeking a manageable place as I was losing my sight. Now I don't really go outside 'my areas'.

If I am going somewhere new I would prefer to have someone else with me. Most places I go to I actually know. I don't really step out of my own territory very much. I tend to stick to what I know now...unless I am with somebody else.

I have a friend with me in new situations until I get the place mapped out: what door to come out off when I leave the railway station, what roads there are and where I should cross, what the quiet roads are etc. Sometimes it may even be the long way around, but it is the way I stick to because I know it. It is the same in buildings like hospitals or dentists or doctors, which cause I am getting older I seem to be visiting more and more. I would have a friend with me and we would find our way together and I would learn from her... and I am comfortable with it. It is the way the friend I have with me would do it and so it is the way that I would do it.

Orientation and Mobility Training:

I have had sliding cane training and that is what I use at the minute. That taught me how to go up and down stairs and use escalators. I will get more training with the guide dog.

05 Lily's Profile:

I hate asking people for help, but when I absolutely have to I always start with 'Hi, I am visually impaired and I was wondering if you could help me'

Name: Lily
Age: 30-40 years old
Sex: Female

Occupation:
Student

Mobility / Orientation Aids:

I use a white cane. Once a friend asked me why I had a tent pole in my bag. I mean for ages some of my friends had no idea that I was visually impaired, because I just coped so well. I have been offered a guide dog but I don't think that I am ready yet.

Hobbies:
Horses and horse riding
Socialising
Travelling

Braille Reader: No

I can't read anymore. I am learning to read Braille at the minute but it is so difficult to learn. Not only is it a different language but the way you learn it is just alien, I mean you are using your fingers. It is a really hard and slow process.

I just keep thinking that I might wait until I can't see anything and then learn. I think that it might be easier. At the minute I can make do...well I can't actually make do - but it is just so so difficult.

Lily's definition of her Visual Ability:

I am partially sighted and have a degenerative eye condition. I only have peripheral vision at the minute and only really have 10% central vision left. Eventually there will be no central vision and I will just have my peripheral vision. So the opposite of tunnel vision.

I started to lose my sight when I was 13 years old and I couldn't see the blackboard. I could only see the colours red and green. I can only see things that are really close to my face.

At 21 it got worse. I went to one of those high street shops Vision Express or something. They couldn't get my prescription so I went to see a specialist. They said that I had early-onset macular juvenile degeneration.

I was told that I was an anomaly within the condition and that normally older people have it. It is a degenerative condition. My sight-loss happened 10 years quicker than was expected and it shocked specialists. I have poor facial recognition, if my best friend was walking past me the street I wouldn't even notice her.

My eyesight is gradually getting worse but bit by bit - so I don't really notice it day to day - but then I immediately notice it when I find out that I can't do something anymore which I could do before without even thinking about.

Lily's Way-finding:

I really pay attention to where I am when I am in buildings. I am constantly taking in information, like 'there is always chairs there', or that 'there is a step there.' I really pay attention when I first go into a building and I think it is just a way-finding thing that I nearly 'collect things' as I go, so the next time I visit I don't fall up the steps or I don't walk into the chairs etc.

I count things all the time as well. I know how far away I am from the door, but if they change that or put something else in the way then I have to learn it all over again. I do it all the time - I don't really think about it. It must be an unconscious, second nature thing that I do, I think that it is just how I have learned to cope with it all - it's normal to me that that is how I do it'.

Lily's Story:

The sight-loss has had a massive impact on my life and my ability to find my way about by myself, but I hate asking people for help. My friends and boyfriend are great but I hate having to rely on them.

I had to give up my job as so much of it involved travelling. Then at 30 years old I had to give up driving. It was a stage of a complete loss of independence, not being able to drive and not being able to do the job that I loved. That was the first stage of noticing the effects of my eye condition. I am always aware that I kind of protect myself from having to say, 'oh I can't see,' because looking at me you wouldn't think that I had a sight problem. It was a difficult time and it took about 2 years to get my head around the condition, what it meant and what it would mean in the future.

Orientation and Mobility Training:

I have had no form of Orientation and Mobility Training because at the minute I feel like I have loads of coping strategies by myself...at some point soon I should probably have some proper training though.

06 Adam's Profile:

I think buildings are always designed for sighted people.

Name: **Adam**
Age: **20 years old**
Sex: **Male**

Occupation:
Student

Mobility / Orientation Aids:

No I don't use anything. I wear glasses but I don't really think of them as an aid 'cause I wear them all the time. I've never used any GPS. I just try to use signage.

Hobbies:
Member of various University clubs and societies

Braille Reader: No

Sometimes in buildings they put Braille for blind people. But I can't read Braille.

Adam's definition of his Visual Ability:

I am basically quite short sighted and registered partially sighted. I have no working Iris in my eye. Severe on a scale... but I manage fine. It's a genetic condition - a specific gene has caused my sight loss. My mother is also registered blind.

I don't have any iris. So my levelling of light intake into my eye, isn't anywhere near as good or quick as other peoples because it's a contraction of the pupil as opposed to the iris.

Generally I find it difficult to focus on things because of my sight-loss. I have trouble working out distances and where I need to get to. When it's busy everyone is moving about and because I can't usually see faces that well I can't see what direction people are headed. If there are objects in-between these people I won't see them at all. This is dangerous as I sometimes trip or fall.

I will eventually lose all my eyesight. However, at present I have enough useful vision which makes me independent.

Adam's Way-finding:

I suppose I use a hierarchy - room association, or things that I associate with that room. The things that I associate are the things that stick out, they don't look like they specifically belong there, and they are not camouflaged into the rest of the room. It doesn't have to be specific to that room. It is something that contrasts from the rest of the room.

Something that was a really different colour from the walls or the floor - something I can easily pick out. By that I can work out where I am and what other rooms attached that I know.

My memory is good when it comes to way-finding tasks I suppose. I wish I was better at remembering other things as well.

Adam's Story:

Personally I think that buildings are always designed for sighted people then someone comes along and decides that they need to put Braille up so visually impaired people can know what is going on. But because it hasn't been designed into the original design of the building it doesn't work as well.

There is this massive spectrum of sight loss and you can't categorise it like that, it's not that simple. Also unless the Braille is on every door at a particular height in the same position every time, then blind people can't see to know it is there, they won't go about feeling every door and wall to find if there is Braille - I don't see how that works.

Orientation and Mobility Training:

Mobility instructors specifically taught me how to orientate around city centres that I wasn't familiar with.

Mostly they are concerned with my ability to plan routes, understand road interaction, measure traffic volume, use traffic lights and other things that just come up as you would walk around.

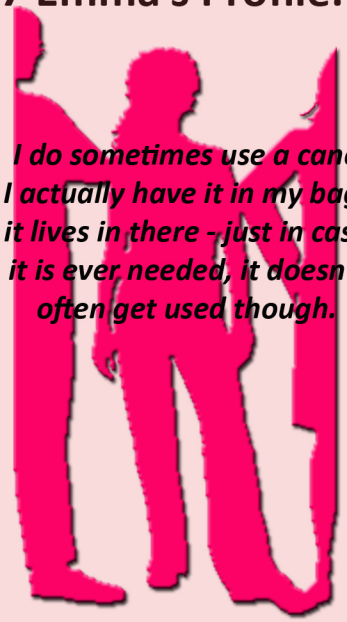
But I wasn't taught anything inside a building, which is maybe why I am so bad at getting around inside buildings.

It's the change, the difference between light levels. When you walk into a stairwell, it's not when there is natural light, it's the reflective surface that causes problems.

So there is a specific point where light is beaming in and reflecting back - you walk into it. It can be dazzling, particularly with my condition because I don't have any iris.

So my levelling of light intake into my eye isn't anywhere near as good or quick as other peoples' because it a contraction of the pupil, as opposed to the iris.

07 Emma's Profile:



I do sometimes use a cane, I actually have it in my bag - it lives in there - just in case it is ever needed, it doesn't often get used though.

Name: Emma
Age: 20-25 years old
Sex: Female

Occupation:
Student

Mobility / Orientation Aids:

I do sometimes use a cane

Hobbies:
Baking
Socialising
Bowling

Braille Reader: No

I can't read Braille yet, I should learn, I use a lot of audio, like audio books.

Emma's definition of her Visual Ability:

Basically I have 10%-15% normal vision in my right eye. I have no vision at all in my left eye; it isn't attached to my brain. It's been that way since I was about 4 years old.

Sometimes I get a shock if I reach for something and it is actually closer than I thought it was, or further away. But generally I guess.

Emma's Way-finding:

My sense of direction is surprisingly lacking considering. And the way directions are given as well are quite important. If someone says ' you take a left, then a right then you go up 3 flights of stairs, take another left and it is on the 7th door on your right'..... I'll just go 'ahhhh...what?'

Whereas if they say 'oh, you'll pass a red door', landmark type directions, they are better.

My friend has noticed that I tend to use echo location as I travel around with him. I don't really know how, I do use my other senses. Sometimes if I do get totally lost, I use a wall and let it guide me around, that way I know that I am safe and won't get run over by a bus for example.

Generally I use sound to gauge the size of a space but how much noise there is, or by how busy the place is affects my ability.

I was in a shopping centre a while back with a friend and it was very busy and I was panicking a little bit. I was in 'don't lose friend mode' but I was panicking a little about what I would do if I lost him weaving in and out of the crowd.

Emma's Story:

I am really independent, and I walk in and out to Uni all the time. Normally I would be with a group, but not because I need any help, just because I happen to be with a group of friends. Most of the time I am usually by myself.

I route learn. Generally I will try to use landmarks. I will remember them on the way in to get them again way on the way out.

Generally I just ask people to just show me because I can get frustrated at the types of directions they give me. I have problems with left and right. I was in a shop with a friend and asked where something was and they said 'it's left'. I went left and they said 'other left'...

Orientation and Mobility Training:

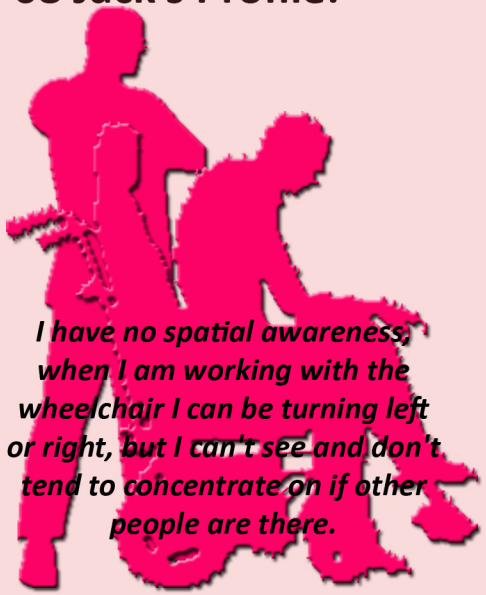
No more sort of doing it myself. It took me quite a while to figure out my secondary school layout because it was stupid. It started off with a main building then stuff had been stuck on here there any everywhere.

I just sort of followed the herd of my classmates although I did often get myself separated from the rest... quite impressive. I ended up on the opposite side of the building from where I should have been. I mean, things like that happen quite often.

I really try not to use aids. If I do, I use my long cane. The occasional borrowed elbow of a friend comes in handy- but that doesn't count does it?

If I am in an unfamiliar city or it's very busy, I do sometimes use the cane. I actually have it in my bag. It lives in there just in case it's ever needed. It doesn't get used that often. Infact I am quite stubborn about not using it until I go into panic mode. I have to use it when it's not safe anymore. That's when I have to take it out of my bag.

08 Jack's Profile:



I have no spatial awareness; when I am working with the wheelchair I can be turning left or right, but I can't see and don't tend to concentrate on if other people are there.

Name: Jack
Age: 20-30 years old
Sex: Male

Occupation:
Student

Mobility / Orientation Aids:

I work with Dave to try to keep safe.*

Jack wears glasses and uses a wheelchair.

Hobbies:

Going to Gigs
Art and Textiles
Reading

Braille Reader: No

I use my Dictaphone a lot and re-listen to it.

Jack's definition of his Visual Ability:

I can only see the middle bit. I have lack of peripheral vision, so I can't see anything in the corners out outside of the middle. I can only really see straight ahead. I am in a wheelchair as well.

I see in tunnels I suppose, I have to use tinted glasses to protect me against glare. Sun really affects my eyesight.

With my visual impairment and because I am in a wheelchair I have more chance of seeing things in front rather than seeing behind. I can't get my neck and head around very far to look behind me because of the big headrest on my wheelchair.

Jack's Way-finding:

I can only see the stuff that is straight ahead so it's difficult when trying to get through buildings, especially if the building is very spacious.

I have no spatial awareness. When I am working with the wheelchair I can be turning left or right, but I can't see and don't tend to concentrate if other people are there. I can turn left or right and not notice that someone was maybe in the way. Before you turn you would have that visual awareness to see someone, but I don't so have more chance of hitting someone or bumping into them as I am driving. I am quite a dangerous wheelchair driver I suppose. I have hit quite a few people.

Dave has had a few battered shins. We work together and he walks behind me and he compensates for my driving. He makes sure that the people in front and out of my eye line are out of the way. I notice sometimes that I lose him too, he might walk straight past me and I can't find him because he goes out of my eye line.

Dave:

There seems to be a natural awareness of how to move between the people around you, cause you are actually aware of how you are walking yourself as well as monitoring the flow of people. So you could be on the left hand side or the right hand side and change. Jack has no concept of people walking around him, so he could be looking in a shop window one minute, and then just takes off again without actually realising that he is trying to get back into the flow of people again.

It is that etiquette of walking. I have found Jack doesn't pay any attention. He nearly needs to -mirror -signal- manoeuvre - like in a car.

Jack:

I stop, but I have no kind of stoppage signal. I don't slow down and stop like you might if you are walking and see something that you want to look at. I am either stopped or moving, the wheelchair can go at different speeds but people have walked into the back of me because I have gone from moving along to completely stopped in a second.

I don't have easy access to areas sometimes. This can be a nightmare because I can't get along the normal route because of maybe some steps or a corridor that is too narrow. So sometimes I have to go in a different direction from everybody else. That can be quite difficult sometimes. Dave goes along and figures it all out.

Orientation and Mobility Training: No

**Dave: My job is to facilitate Jack, to get around the areas and places in buildings that are not accessible to him. We work together 22hours a week, and that allows him to get around the best he can, we figure it all out as we go along. Sometimes shops are inaccessible, so I build up a relationship with the staff so that we can take things outside to show Jack and he can decide if he wants them or not. We just use our wee tricks and make them up as we go along really. Things that would inhibit him normally are taken away because I have always been there to help him.*

09 Grace's Profile:

I will try and make myself think that it should be safe to go in to this building.

Name: Grace
Age: 40-50 years old
Sex: Female

Occupation:
Doctor

Mobility/Orientation Aids:

I wear contact lens
Oh, and I use Sat Nav in my car

Hobbies:
Socialising
Reading
Listening to music.

Braille Reader: No

Braille fascinates me.

Grace's definition of her Visual Ability:

I am either short or long sighted. One of the two. I wear contact lenses and they mean I can see fine.

Grace's Way-finding:

When I go to a building for the first time, I must admit, I feel much more comfortable if I am with someone. Even if they don't know where we are going either.

For some reason I feel better if the two of us are lost because we sort of share the anxiousness. I certainly prefer that, or even better would be for the person to meet me at the front of the building.

For example, before coming into a building I don't know I might sorta come in and hang around in the foyer. I will just quickly check that there is a secretary there or there is something in the building which shows me where to go.

I suss it all out I suppose. I will check out what the options are so I know what to do before I go any further. That way I can think oh there are stairs so I know at some point that I am going to have to go up stairs.

Grace's Story:

I have found myself getting lost in a strange building and frantically running up the staircase 'cause I am so frustrated with myself. So I suppose getting stressed out is maybe an injury in that sense, but physically I have never been hurt - yet.

I get really frustrated and really nervous, really sorta sweaty and hot and anxious, especially in a building that I don't really know.

It's not too bad in a building I know because I just head back down the stairs and I will try again and take a different route.

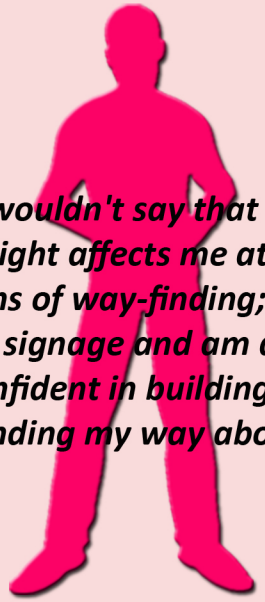
But in a building I don't know.... ahhh.... I just feel I want to get out of there. I do think like this quite a lot.

There is a lot of anxiety that goes on there. You feel as if you shouldn't be there especially if you are a visitor and so are entering a private building, unknown to you. It's not your work place and not where you live. You are visiting, but you don't want to be seen as someone who is perceived as a thief or someone dodgy.

So there are all these thoughts that go through your mind - are people suspicious of me here. Yeah so all these anxious feelings go through my mind.

Orientation and Mobility Training:
No.

10 Ben's Profile:



I wouldn't say that my eyesight affects me at all in terms of way-finding; I can see signage and am quite confident in buildings at finding my way about.

Name: Ben
Age: 20-30 years old
Sex: Male

Occupation:
Student

Mobility/Orientation Aids:

No, I use GPS in my car sometimes.

Hobbies:
Computers
Socialising
Reading

Braille Reader: No

Ben's definition of his Visual Ability:

No, I have no visual impairment, none at all, I don't wear glasses either. I know that my eyesight is 20/20 cause I just had them tested recently.

Ben's Way-finding:

I wouldn't say that my eyesight affects me at all in terms of way-finding; I can see signage and am quite confident in buildings at finding my way about.

I am good at remembering, like if I know where something else is I can usually orientate myself based on that.

I would say that I am pretty good at way-finding in terms of places I have been to before, and if I am in quite a new environment.

I am usually quite lucky about guessing and able to figure out things based on things like signage or landmarks.

So I am usually quite good.

Ben's Story:

I find it really difficult when I ask for directions and they give me a load of names and left and rights.

I find myself just nodding and agreeing and then getting along so far and then asking the next person.

I literally can't remember names if someone said to me a bunch of names and stuff I would spend the whole time looking intensely for the first thing and then forgetting the rest.

I find directions with visual landmarks are really easy but road names, numbers and left and right directions are really difficult to remember.

Orientation and Mobility Training:

I don't have any training or orientation in way-finding. My friend is always trying to get me to come along orienteering with gps but it's not really my thing.

Contents:

Summary of Participant Profiles

The Participants

Ten Participants [above], five males [pseudonyms: Alfie, James, Adam, Jack and Ben] and five females [pseudonyms: Katie, Lily, Evie, Emma and Grace], took part in the Way-finding Scenario.

In addition to *setting the scene* and introducing these Participants, the Participant Profiles highlighted prominent themes regarding; Participant Details, Self Definition of Visual Ability, Orientation and Mobility Training, Way-finding Aids, Braille, and Way-finding Experience & Anecdotes. Sequentially these points of discussion will now be summarised.

Participant Details

As a diverse group the Participants' age range varies from the youngest Participant, Adam at 20 years old to the oldest Participants, Alfie and Evie at 60-70 years old. They each have different professions and educational backgrounds. Adam, Emma, Jack, Ben and Lily are students; Evie is a retired chef; James is self-employed; Alfie is a volunteer in the charity sector; Katie is a professional in the legal system and Grace is a Doctor. All of the Participants reside in Scotland, although Evie was originally from New Zealand.

Self Definition of Visual Ability

The Participants each had varying degrees of visual ability and loss which came about at different times in their lives. They used both experiential description as well as medical definition to describe their visual ability.

Alfie lost his sight completely in his late 50's and explained that he could *'see nothing'* and is *'in total darkness all the time'.* Katie lost her sight in her early 20's and is *'totally blind'*. Although having *'some sense of shadows'* she stressed, *'I have no useful sight at all when I am out and about'.* James has been *'blind since birth'* and although registered blind, has *'some useful vision in terms of getting around*'. He explained, *'It depends on how tired I am,*

Orientation and Mobility Training Aids

Figure A: Symbol Cane

Image sourced from: http://www.rnib.org.uk/shop/Pages/Category.aspx?Category=rnib_symbol_cane

Figure B: Roller Cane

Image sourced from: http://www.rnib.org.uk/shop/Pages/ProductDetails.aspx?category=ambutech_folding_long_cane_roller_tip&productID=ML5301

where I am, how much attention I am paying to what is going on around me, on the light and what I am doing.' Evie has a degenerative sight-loss and explained that she has peripheral vision, is highly sensitive to light, has double vision and wears tinted glasses. She identified that she can now only see the colour red. Lily also has a degenerative sight-loss and started to lose her sight when she was thirteen. She has peripheral vision and explained, *'I can only see things that are really close to my face'*. Adam has *'no working iris'* in his eye and is sensitive to light as well as being *'quite short-sighted and registered partially sighted'*. He wears prescription lenses. Emma has no vision in her left eye and a small amount of vision in her right eye. Jack *'can only see in the middle bit'*, *'tunnels',* so cannot see anything using his peripheral vision and stated, *'I can only really see straight ahead.'* He wears corrective lenses and also has mobility challenges and uses a wheelchair. Grace's sight is also corrected with lenses and Ben has *'no visual loss at all'*.

The Participants received varied amounts of Orientation and Mobility training, with some having undertaken none at all. Of those who used mobility aids, the method of aid varied between Participants.

Alfie, Emma, Jack, Grace, Lily and Ben had not experienced any form of orientation and mobility training. Adam, Grace and Ben did not use a mobility aid.

Alfie stated he used a Symbol Cane [Figure A] to inform others that he was blind and '*to hit off things as I am walking to make sure nothing gets in my way'*. Emma preferred an *'occasional borrowed elbow of a friend'* and only utilised her cane if she *'goes into panic mode'*. Lily also used a cane and said that she may have *'some proper training in the future'* but currently feels that she has *'loads of coping strategies'*. Jack uses a wheelchair and also has an assistant, Dave, who helped him with daily tasks including getting around buildings.

Katie has a guide-dog, Bruno, and said that she is *'a very competent person at being able to get out'.* She received training in using the long cane but because it didn't make her *'feel safe'* she undertook further training with Bruno. She identified that he has enabled her to *'travel all over'* and she feels *'much more confident'* with him. She explained that when way-finding, Bruno was *'trained to walk in straight lines'* but she was the one who needed to be able to understand their surroundings to way-find through them. Evie also took part in orientation and mobility training and used the Sliding Cane and was taking part in further training with a guide-dog.

James attended a Blind School from the age of five and as a teenager took part in orientation and mobility classes in the external environment to ensure that he *'was safe moving about outside'*. James has trialled various way-finding aids such as different canes, talking devices and GPS systems, however favours the Roller Cane [Figure B]which enables him to *'feel the whole surface area on the ground'.* James highlighted that although he has a job and has *'buying power'* stressed *'a lot of technologies for people with visual loss are of such an expense that they are out of reach of those who could benefit from them'.*

Adam said that although he had experienced orientation and mobility training in the urban environment, he was never taught any techniques relating to finding his way through the internal environment of a building. *'Mobility instructors specifically taught me how to orientate around city centres that I wasn't familiar with. Mostly they are concerned with my ability to plan routes, understand road interaction, measure traffic volume, use traffic lights and other things that just come up as you would walk around. But I wasn't taught anything inside a building which is maybe why I am so bad at getting around inside buildings.'*

Baker (1999), Barker (1995)and The Guide Dogs for the Blind Association (2009), highlight the positive impacts of Orientation and Mobility Training within the external environment.

Braille

The ability to read text or Braille format varied across the group. Alfie, Evie, Adam, Emma, Jack, Lily, Grace and Ben could not read Braille while James and Katie could. Adam, Emma, Jack, Grace and Ben [to varying degrees] could read text while Alfie, Evie and Lily could not read either.

Several of the Participants who had significant visual loss highlighted that sighted people often had misconceptions regarding their ability to read Braille.

Katie: *'There is often the assumption that if you are blind then that means that you can read Braille. A lot of people think that I can just 'cause I am blind.'*

Alfie: *'Just because I am blind it doesn't give me some special "power" to read Braille.'*

Adam: *'Architects put Braille in buildings for blind people but I can't read Braille. They don't understand that "blind" covers a whole range of sight loss. They think "blind" means you can't see a thing - but it doesn't work like that.'*

James was taught to read Braille from the age of five at School. Katie had learned Braille since losing her sight but explained *'it's not my preferred format and I am not very fast at it.'* Lily stated that because she cannot read text anymore she was trying to learn to read Braille, but explained, *' not only is it a different language but the way you learn it is just alien, I mean you are using your fingers - it is a really hard and slow process.'*

Way-finding Experience & Anecdotes

The Participants provided insight into their way-finding experiences and each had different stories to tell. Alfie was always fully dependant on a *'sighted person'* to assist him way-finding in both familiar and unfamiliar environments, identifying that he would*' panic'* if he was by himself. He stated: *'I always have someone else with me all the time when I leave the house. My garden is the only place I will go to by myself'.* He explained that he found it helpful when people explained what was happening around him and identified that he would

find it useful if the building communicated way-finding to him but that it had to *'be different than the signs that are up'.*

Jack was also fully dependant on his assistant Dave and said that he needed someone with him in an unfamiliar environment as he doesn't know if he will be able to manage by himself. He explained that because of mobility challenges he is not always able to have access to areas of buildings. He stated: Dave *'goes along and figures it all out'.*

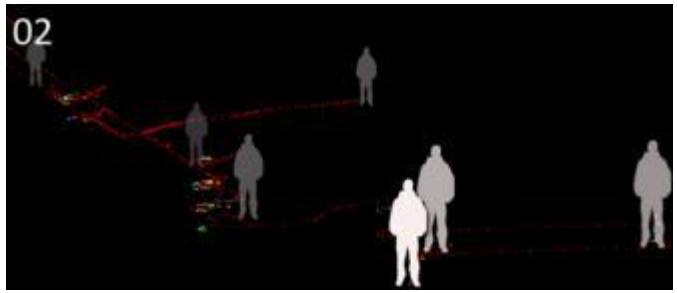
Evie identified that she often avoids going into unfamiliar environments by herself and stated: *'I don't really step out of my own territory very much and I tend to stick to what I know...unless I am with somebody else.'*

Katie said that she would *'have to rely on a stranger'* when coming into a building for the first time for help in finding her way. She described instances of using her immediate senses to understand a space and said *'I can only sense things through sound and touch'.* She identified that she feels *'really vulnerable'* because she sometimes is not able to use her senses to *'touch the edges of an open space'*. She said that if she was walking around a building with her guide-dog then she would find it helpful if buildings had *'easy little messages'* to communicate way-finding to her.

Adam identified that although he liked to be accompanied by someone else, it was '*not always practical'*. He stated: *'Sometimes trying to find my way by myself is a bit of a waste of my time. Generally I am ok, and can do it, unless there are a lot of people in the area.'*

James, Emma, Grace and Ben acknowledged that they were mostly independent way-finders.

Emma said she felt *'quite confident'* when she is by herself and identified that she will *'route learn'* using '*landmarks'*. She stated that sometimes she will ask people to take her to a



During the way-finding journey [Phase 2], Alfie became fully dependant on the researcher to guide him to the destination while Evie relied on a security guard. Jack and Dave worked together to find the way to the destination.

Katie and James asked that the researcher accompany them, not to help them to way-find, but to warn them if they were going to have an accident. Lily, Adam, Emma, Grace and Ben carried out the way-finding journey independently.

destination because of getting *'frustrated at the types of directions'* which are given out. She said that she often used sound *'to gauge the size of a space'.*

James explained that he wasn't '*prepared to sit about and not do things',* and identified that he had to be extremely focused when way-finding. He explained: *'Getting around as a blind person is tiring, I mean you are switched on all the time, I don't think people keep in mind how tiring it is, you are paying attention all the time to what you are doing in a way that sighted people probably aren't.'* He added, *'there are barriers to use and access buildings and services. We just can't get in to a building, or use the bank machine, or see the system of queues to know what is going on'.*

Grace explained that she preferred to be accompanied by someone when in an unfamiliar building because she said '*we sort of share the anxiousness.'*

Ben said he was *'pretty good at way-finding'* and was *'lucky about guessing and able to figure out things based on things like signage or landmarks'.*

References

BAKER, M. (1999) *Rights of way : transport and mobility for visually impaired people in the UK*, Royal National Institute for the Blind.

BARKER, P. J., BARRICK, J., WILSON, R. & ROYAL NATIONAL INSTITUTE FOR THE BLIND (1995) *Building sight : a handbook of building and interior design solutions to include the needs of visually impaired people,* London, HMSO in association with the Royal National Institute for the Blind.

THE GUIDE DOGS FOR THE BLIND ASSOCIATION 2009 What we do The Guide Dogs for the Blind Association, [online] Accessed 30th Sept 2009 http://www.guidedogs.org.uk/whatwedo/

Appendix C

Sample of Participant Conversation & Trace

Sample of Participant Conversation: Emma

Phase 1: *Conversation with a Purpose*

Before the Way-finding Task

Q. How would you, in your own words, describe your sight loss/impairment?

A. Basically I have 10-15 normal vision in my right eye. I have no vision at all in my left eye. It isn't attached to my brain. It's always been that way. The last time I got worse I was about 4 so I don't really remember it.

Q. In terms of buildings. This research is about navigation and orientation and how people find their way around buildings.

Q. Could you tell me a bit about your experience of way-finding in buildings?

A. It kinda depends really, if it an unfamiliar building I tend to panic slightly and say to myself 'so are there any signs? If there are signs can I actually read them and if I can't, ok, is there anyone I can go and ask?' or 'Am I feeling brave enough to go and find it myself?'

Q. Have you taken part in any orientation and mobility training or any training with aids?

A. No, more sort of doing it myself. It took me quite a while to figure out my secondary school because it was stupid. It started off with a main building then stuff had been stuck on here there any everywhere. I just sort of followed the heard of my classmates although I did often get myself separated from the rest (quite impressive) and ended up on the opposite side of the building from where I should have been. I mean, things like that often happen.

Q. Do you use any type of orientation and mobility aids, like a guide dog, cane or technology?

A. If I am in an unfamiliar city or it's very busy, I do sometimes use a cane, I actually have it in my bag - it lives in there - just in case it is ever needed, it doesn't often get used though - I am quite stubborn about using it - but sometimes. Until I go into panic mode when it is definitely not safe anymore - that's when I take it out.

Q.

Have you ever used anything else?

No not really, mostly the long cane. The occasional borrowed elbow of a friend - but that doesn't count.

Q. We have talked about coming into a building that you don't know and you say that it already makes you panic slightly because you don't know what is going to come up. How would you cope with finding out the information that you need to take the panic away and get you to where you want to be? Talk me through as you walk through the door - what would you do?

A. It depends where in the building I need to be. When I first came to uni, I had to be in a room in the tower building - when I finally found the tower building, I group of people were waiting in the foyer, so I thought they might be going to the same place as me and I was right. Sometimes I'm not so

lucky and sometimes I just happen to find places by chance. If the building is logically laid out and I am given a room number and it's like 2.12 then you can probably figure out that ok, it's on the 2nd floor and it will be with other rooms 9, 10, 11.

Q. Do you ever go to reception for directions?

A. Yes definitely!

Q. Do you think you have a good memory to remember these directions?

A. No, definitely not. My sense of direction is surprisingly lacking considering. And the way directions are given as well are quite important. If someone says ' you take a left, then a right then you go up 3 flights of stairs, take another left and it is on the 7th door on your right' I'll just go ahhhh...what? Whereas if they say ' 'oh, you'll pass a red door, landmark type directions'.

Q. Do you ever use your other senses, like sounds, smells, touch etc?

A. Sometimes a little bit, my friend has noticed that I tend to use echo location as I travel around with him.

Q. What do you mean by echo location?

A. I don't really know, I do use my other senses...

Sometimes if I do get totally lost, I use a wall and let it guide me around, that way I know that I am safe and won't get run over by a bus for example.

Q. Do you ever use echo location in any other way - e.g. - the guy who clicks?

A. Generally I use it to gauge the size of a space but how much noise there is, or by how busy the place is. For instance I was in the Overgate a while back with a friend and it was very busy and I was panicking a little bit in 'don't lose friend mode' but I was panicking a little about what I would do if I lost him weaving in and out of the crowd.

Q. Different materials in buildings tend to make different sounds as you move through them do you find this helpful/hinder?

A. I don't really register it I don't think, I will register it if someone said oh, you will go through a hall way that is carpeted. That kind of thing. I will notice the material changes but I don't really register them in anyway. I will notice a loud floor - sort of thing - or a really dark or light space.

Q. Do you generally visit buildings by yourself, or for first time visits do you prefer to have someone else with you?

A. It depends really, I mean fairly often, I am really independent, and I live out about a 2mile walk, so I walk in and out all the time. I have quite a few friends up in the other University and am in and out of their building quite a lot. So normally, I would be with a group, but not because I need any help, just because I happen to be with a group of friends. Most of the time I usually by myself.

Q. Is light, well light places quite important to you? Do you find colour contrast quite important to you?

A. Again, it depends, I have days when I can't tolerate a large amount of light and certain days were everything just goes a bit weird. Generally unless it is really bright or really dark, I don't have any problems.

A. Colour contrast is really helpful - defining walls from floors, doors not made out of glass

Q. Have you ever been hurt or had an accident when you have been in a building?

A. Lots, most recent one. They have automatic swing doors and somebody had pressed the button for the door and I managed to get bashed by the door on my arm and face because I didn't see it coming.

Steps - if they don't look like steps to me - I miss them; if they are the same as the floor it is impossible for me to see them. I don't have any depth perception, so I can't tell how far they go down, from one step to the next. If I don't notice the step I fall down them, it hasn't happened recently. But it has happened a few times before.

Q.Can you talk a bit about your depth perception? If you have no depth perception, how do you go about trying to get the information that depth perception provides?

A. To a certain extent, I can generally figure it out. Sometimes I get a shock if I reach for something and it is actually closer than I thought it was, or further away. But generally I guess.

Q. Would you touch to back up your guess? Or is this is maybe something that you aren't conscious about doing?

A. Probably do, if I was going through swinging doors I would perhaps put out my arm to catch the door and judge where it is.

Q. What do you do if you ever become spectacularly lost in a building?

A. If I could remember where I had come from I would try to retrace my path. If that wasn't working and I had completely disorientated myself and I can't tell up from down. This does happen. I try to find a staircase, or a landmark to go back to.

Q. Would you ever ask anyone for directions?

A. Yes if there was someone about me would.

Q. Can you think of any difficulties that you have with way-finding - from day to day?

Revolving doors - every time I use them I get hurt by them. And we use the other 'disabled door' and we get shouted at - that when I just say 'I can't see' and they let us through. We got stopped by the Security Guard who shouted “this is a disabled door”. I had to reply with “I can't see”. He said, “Oh, Ok then I suppose that's alright.” In the end he let me through but he made my friends use the revolving door.

Unfamiliar objects appearing in a familiar building are a problem. If I am walking down a corridor which I have walked down a million times before. But this time someone has left a desk, in the middle of the corridor, I am probably going to walk into it...I'm not concentrating because I know that building.

Q. Do you tend, when you come into a building and you are leaving it again....do you pick up clues on the way in that you use on the way out

A. I route learn - for a while I could get to ????, but I couldn't get back. Generally I will try to use landmarks, remember them on the way, to get them again way on the way out. Generally I just ask people to just show me because I can get frustrated at the types of directions they give me. I have problems with left and right.

I was in Tesco's with a friend and asked where something was and they said it's left, I went towards it and they said 'other left'

Q. You mentioned being Tesco's there, are there any types of buildings that you can think of that you are always able to find where you need to go; it is a pleasure to be in the building - not too much light, not too dark..... Or is there a building where you absolutely can't stand being in it?

A. I know how to get there but all along the way, I am questioning myself, not sure that I actually do. Curved stair cases in the dark are a problem. If I know they are there then that's fine, but if I don't then it's just dangerous.

If it's an unfamiliar building I tend to panic slightly. I try to seek out signs but I can't read them usually or I try to find someone or I will ask myself 'Am I feeling brave enough to go and find it myself?'

Phase 3: *'Conversation with a Purpose'* [Post-Way-finding Task]

After the Way-finding Task

Q. How are you feeling?

A. Fine, fine, it was bit rubbish I didn't get to where I was supposed to go. This building is rubbish.

Q. Could you talk about your experiences and how you found your way?

A. I did think that it would be this side of the building, so I came in the front door and turned left and there was a sign on the wall that I could see and it was pointing that room is in this direction 2. Something so I presumed that it was the second floor which meant that 1st floor must be down a level. So I came down and tried to find more signs, but they weren't great signs, in fact I couldn't read them at all. There were doors at the end, so I walked through them and there were sort of office rooms and they were like 1.10 and 1.13 so I had decided that I had come to far along and then there was a little sign that I concentrated hard on reading and it said room 103 -108, so that is when I came in.

I think there was some Braille. If you know it's there and you can read it then I am sure that it would be helpful but not to me - I can't read Braille - I have never noticed it there before. It is too late for me to learn it - I would struggle, if I was taught when I was younger it would be great. I use audio quite a lot.

Can you think of anything else in regard to way-finding?

What about in the entrance, the reception area?

If there was better signage, it's started off well and then it ended and there was nothing - there was NO SMOKING written in large letters but nothing to help me find my way...- lead in and not helped

Walls full of information are confusing, it's difficult to find what you are looking for- signage should stand out - larger text, colour, and shapes...throughout the building if all the signs were the same colour you would assume they connected together the places you wanted to find.

If there was better signage, it's started off well and then it ended...- lead in and not helped. If there was better signage which was all the way through it would help. I was led deep into the building but then there was no help. There was a "No Smoking" sign written in large letters but nothing to help me find my way about. Walls full of information are confusing. There were so many. There was too much information and no separation between the different ads – "flat for two" and the "direction pointing stuff". She added: 'it's difficult to find what you are looking for. Signage should stand out - larger text, colour, and shapes...Throughout the building if all the signs were the same colour you would assume they connected together the places you wanted to find.

Walls full of information are confusing - signage should stand out - larger text, colour, and shape

When I was walking around I learn, count, and remember all the landmarks on the way through a building to get them again on the way out.

The stairs were hard to see. I thought I had already reached the landing but tripped and fell 'cause I couldn't see there was another step. Its so rubbish 'cause I couldn't see there was another step. If they are the same as the floor it is impossible for me to see them. It's so rubbish I can't tell how far they go down from one step to the next. If they all merge, like if all the steps all merge together then I will fall down them.

I am exhausted now.

This was deemed an ideal time to stop the Way-finding Scenario. We had refreshments before the Researcher reminded the Participant that they could get in touch if they had any questions or wanted to withdraw their involvement from the study.

Sample of Participant Trace: Evie

[A complete copy of all Participants' Way-finding Trace can be found in digital format on the CD at the back of the Thesis]

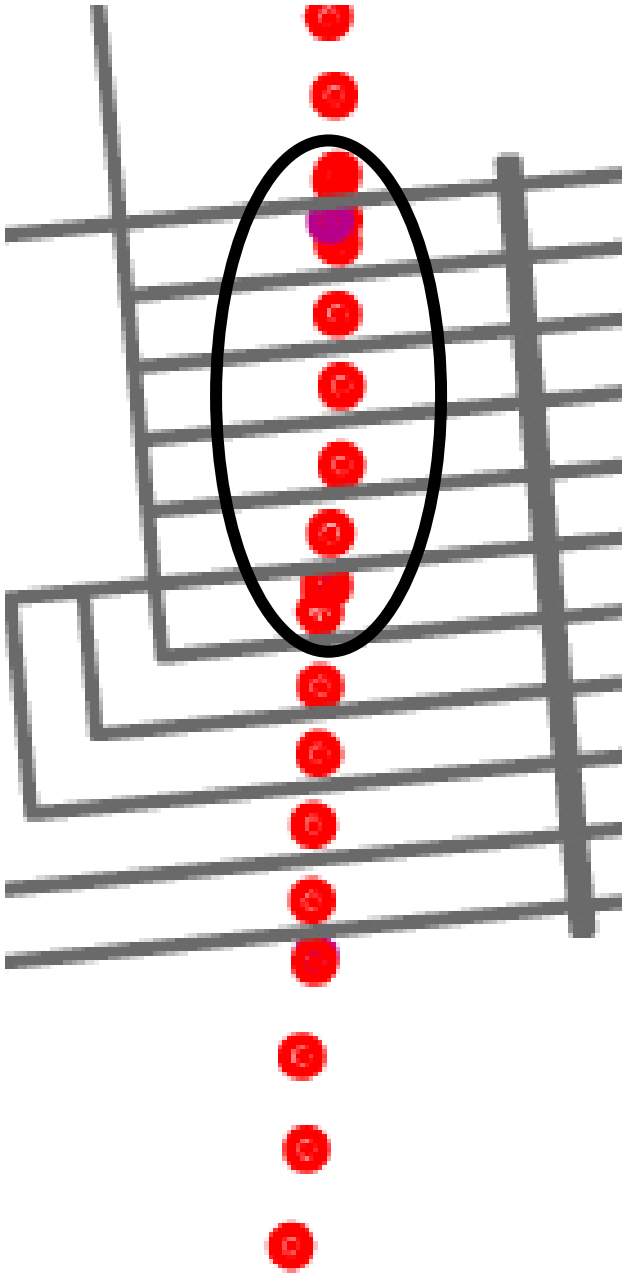
Way-finding Trace_04_Evie

Context of Way-finding

Way-finding Hot-Spot

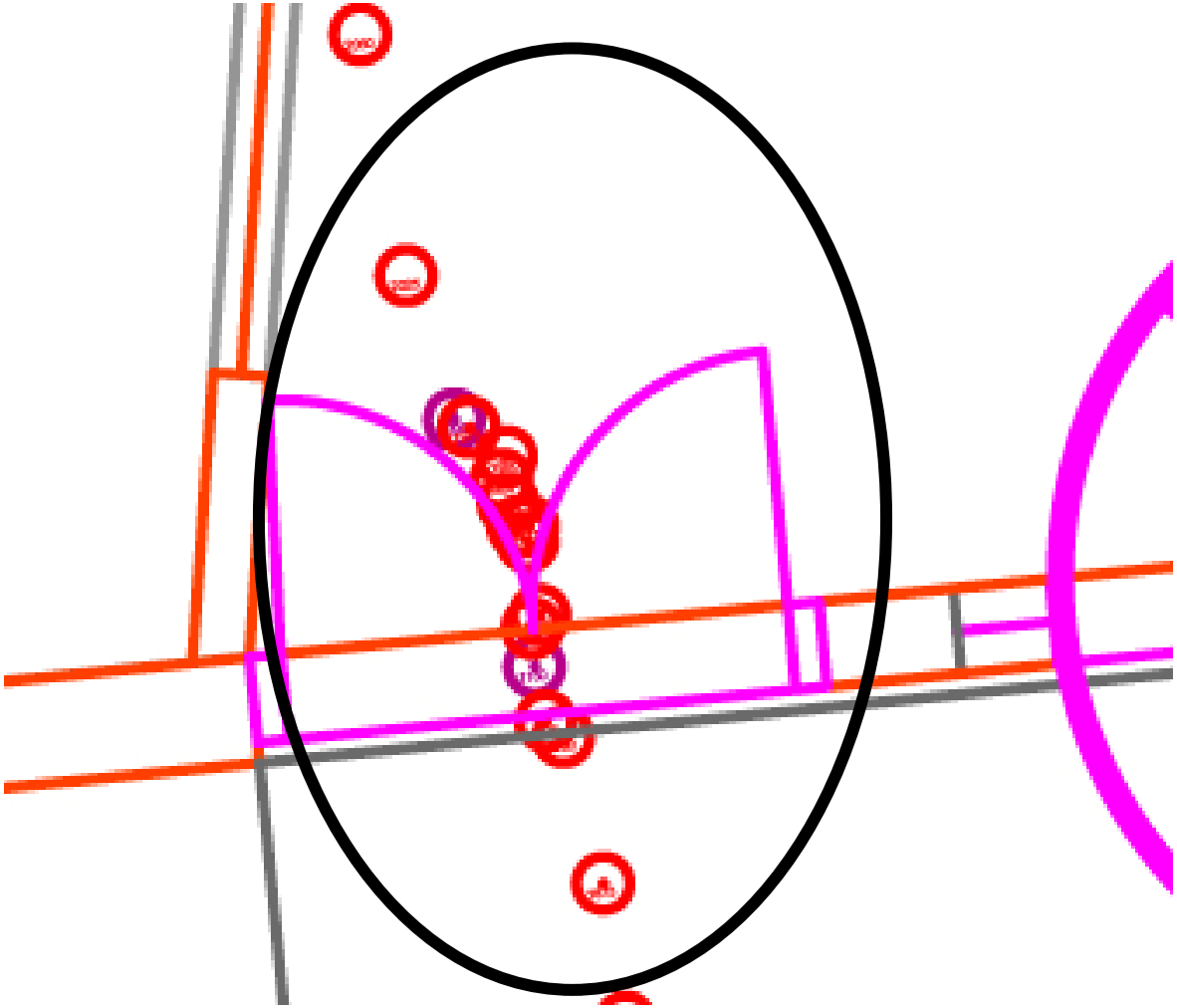
Evie_Context_External

Evie_Hot-spot 1

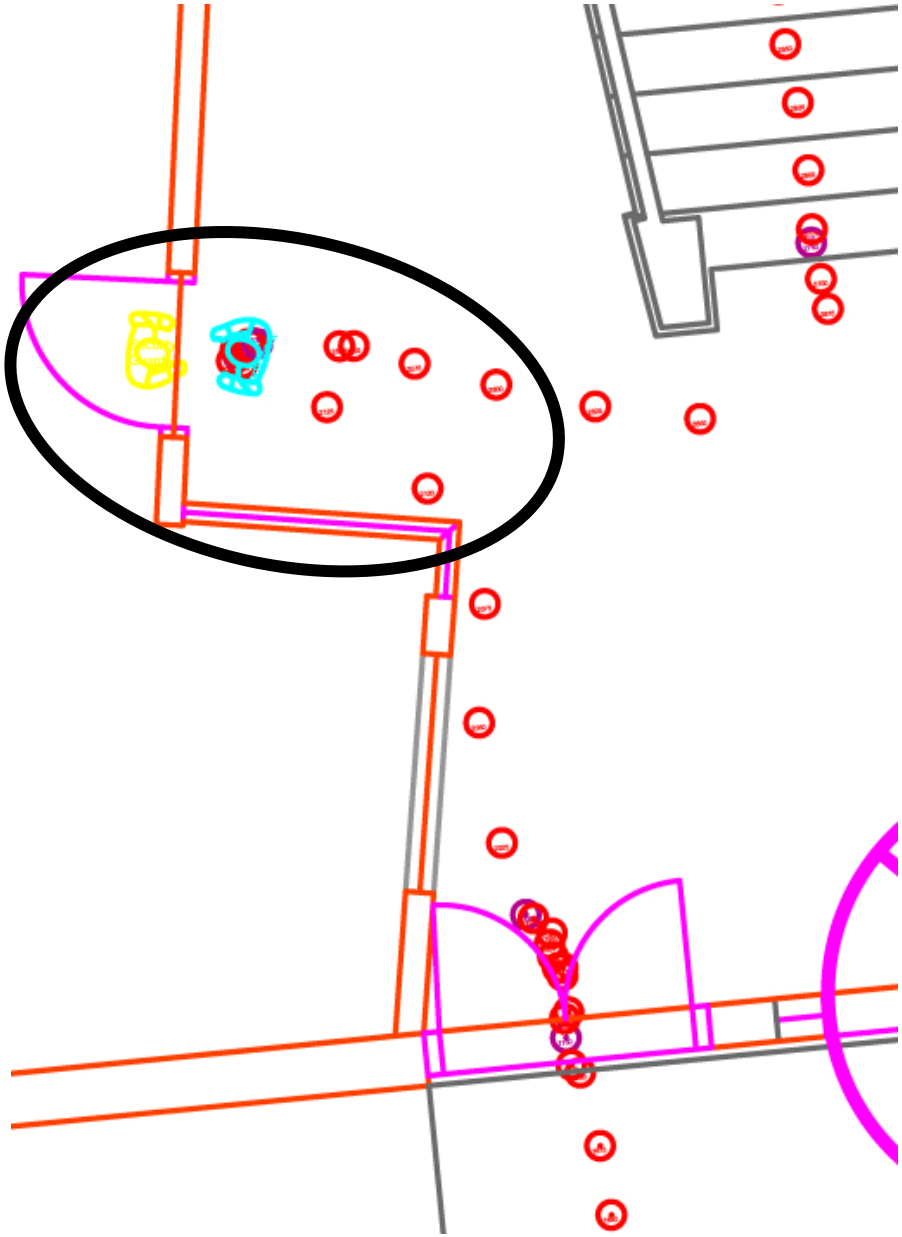


Evie_Context_Level 2 (Internal)

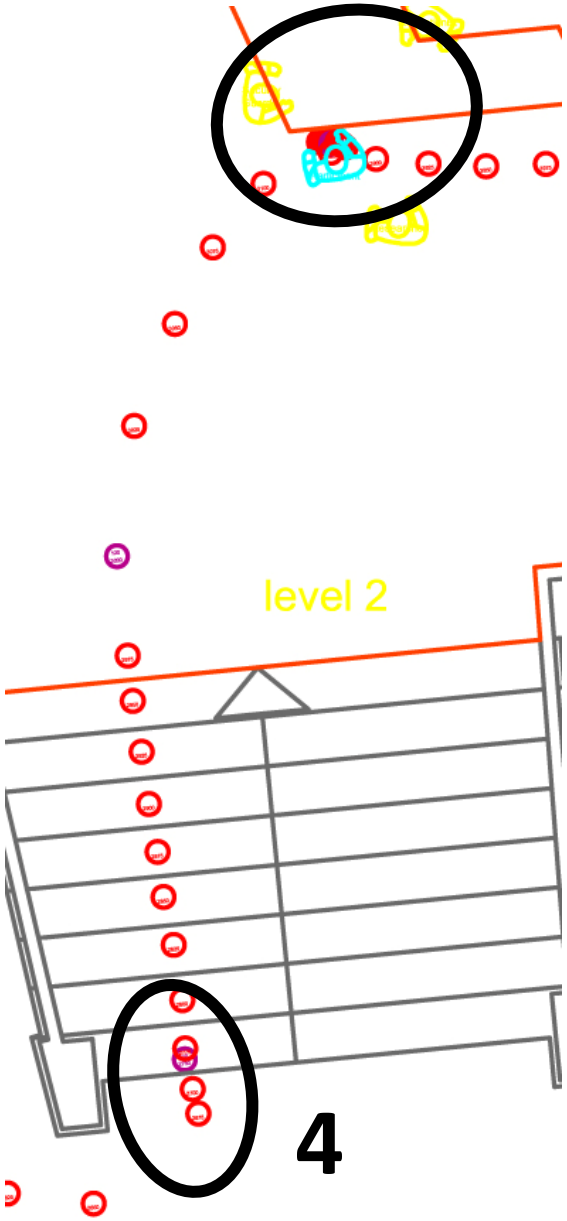
Evie_Hot-spot 2



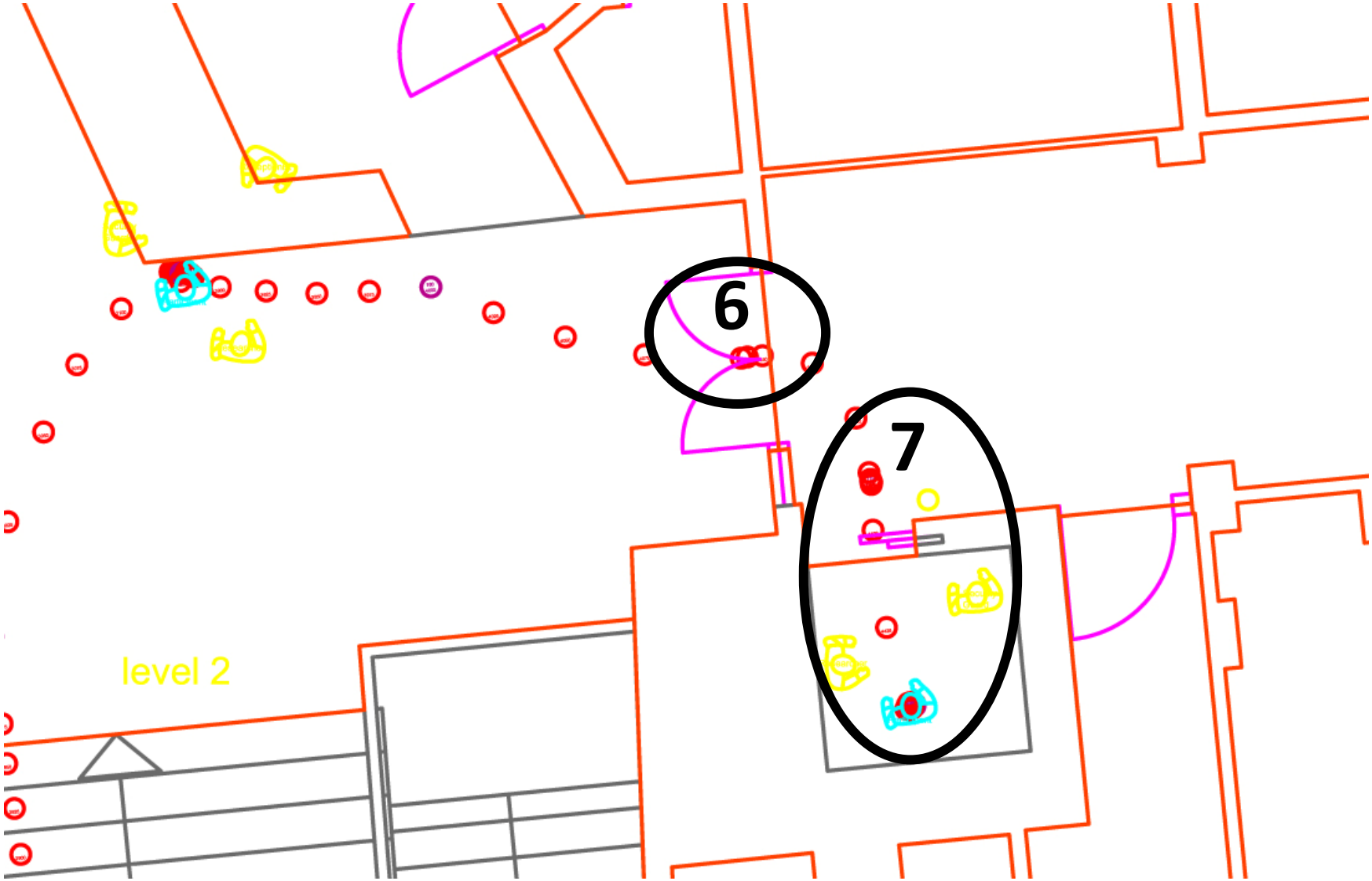
Evie_Hot-spot 3



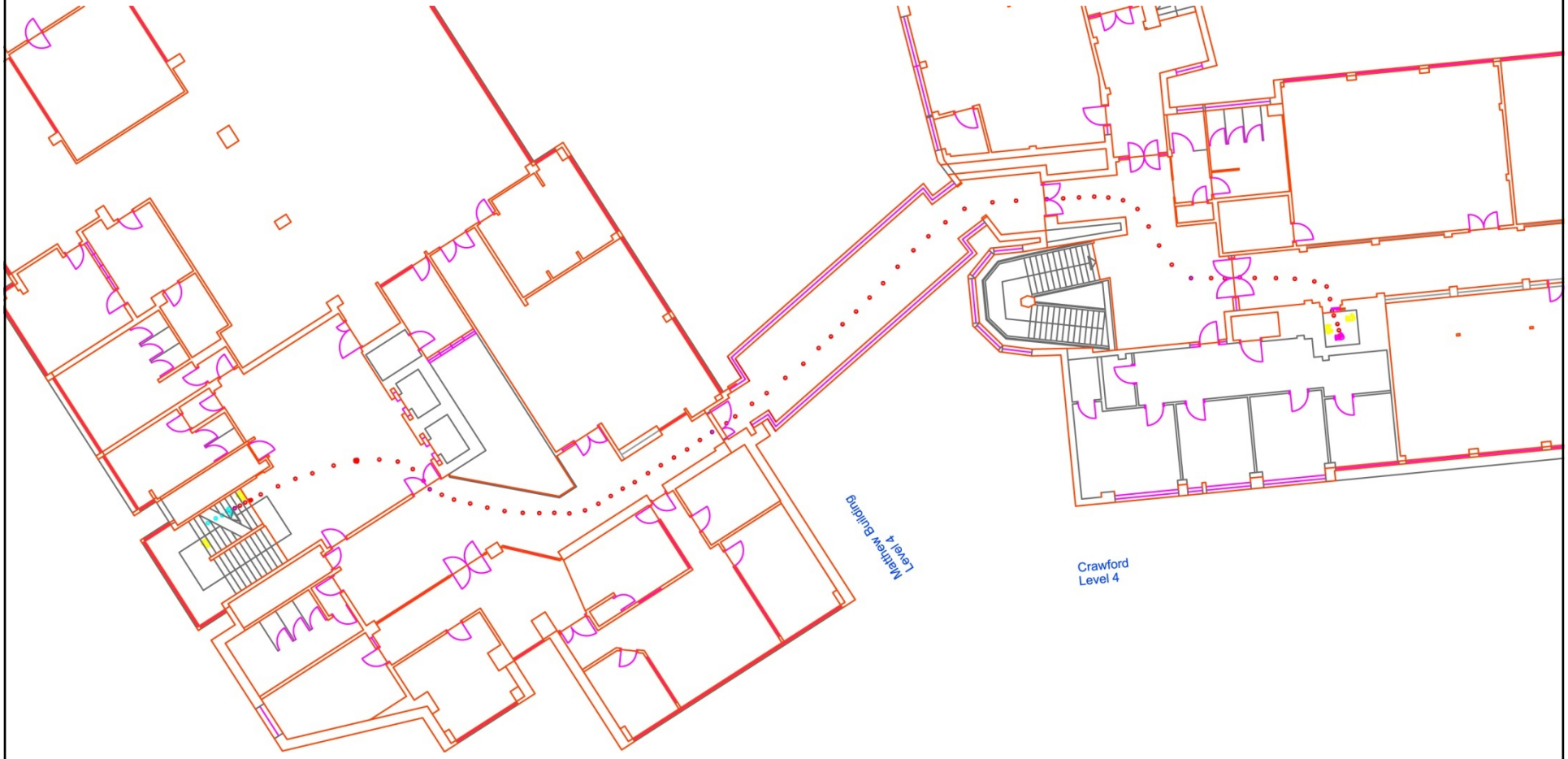
Evie_Hot-spot 4 & 5



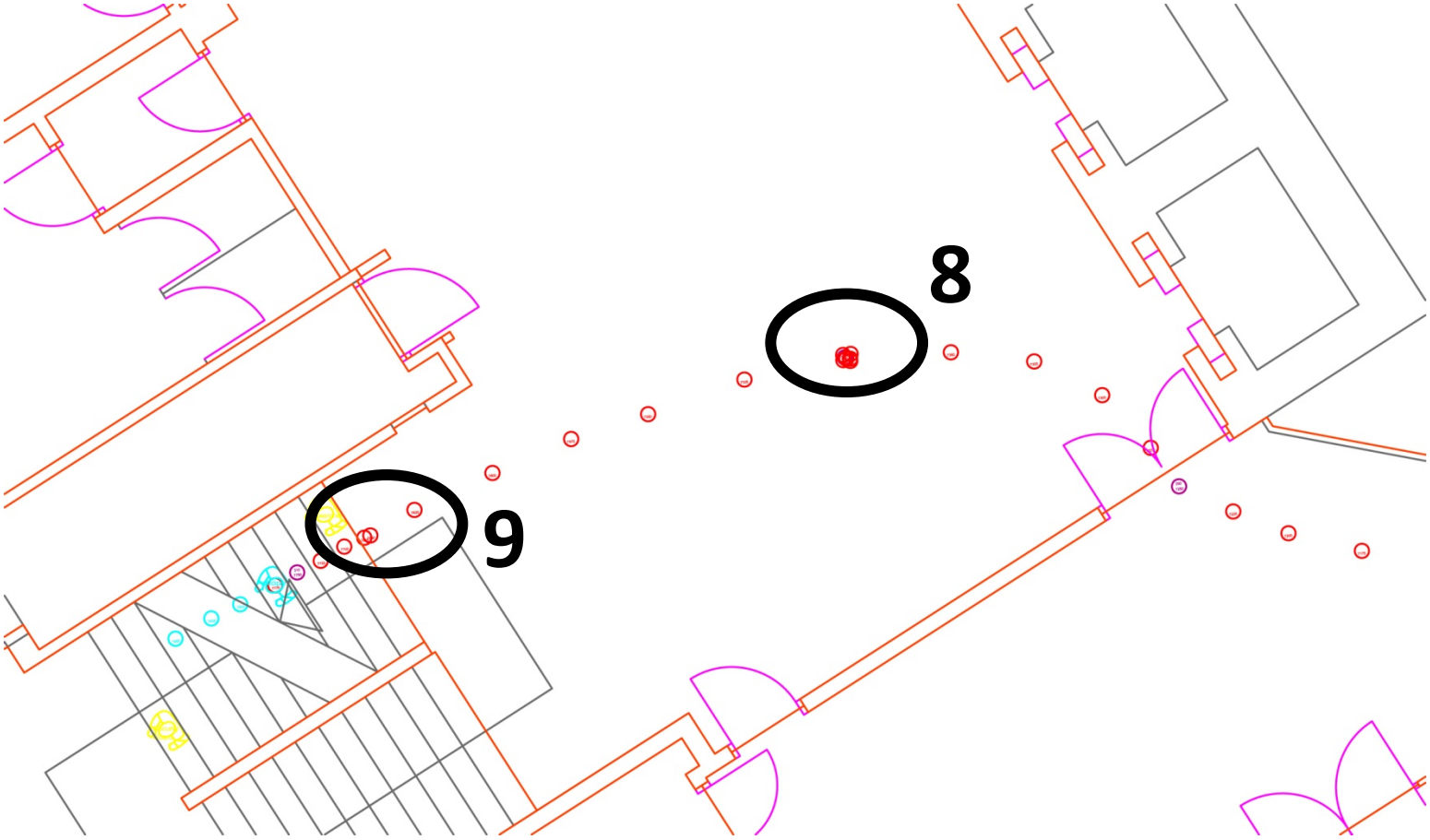
Evie_Hot-spot 6 & 7



Evie_Context_Level 4



Evie_Hot-spot 8 & 9



Destination_Evie_Context_Level 5

Destination_Evie_Level 5

Appendix D

Ethical Application & Approval Documentation

Applied for – 17th December 2008

Granted - 24th February 2009

Contents

UNIVERSITY OF DUNDEE UNIVERSITY RESEARCH ETHICS COMMITTEE APPROVAL FORM

Title of project: Way-finding for People with Visual Impairment: A 'Design Tool Kit' for Architects.

Name of lead Investigator, School (or equivalent), Status (e.g. staff, student):

Miss Lesley McIntyre. Dundee School of Architecture. Post-graduate Research Student/Part-time Teaching Fellow

Other Academic Staff involved (e.g. supervisor, co-researchers):

Professor Simon Unwin, Jeanette Paul, Professor Jennifer Harris

E-mail address:**ljmcintyre@dundee.ac.uk / lesleymcintyre@hotmail.co.uk**

Date: **12th December 2008** UREC Ref no. (LEAVE BLANK):

			YES	NO	N/A
1	Will you describe the main procedures to participants in advance so that they are informed about what to expect in your study?		x		
2	Will you tell participants that their participation is voluntary?		x		
3	Will your participants be able to read and understand the participant information sheet?		x		
4	Will you obtain written informed consent for participation?		x		
5	If the research is observational, will you ask participants for their consent to being observed?		x		
6	Will you tell participants that they may withdraw from the research at any time without penalty and for any reason?		x		
7	With questionnaires, will you give participants the option of omitting questions they do not want to answer?		x		
8	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?		x		
9	Will you give participants a brief explanation of the purpose of the study at the end of their participation in it, and answer any questions?		x		
10	Will your project involve deliberately misleading participants in any way?			x	
11	Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort? If Yes, give details on a separate sheet and state what you will tell them to do if they should experience any problems (e.g. who they can contact for help).			x	
12	Do participants fall into any of the following special groups?	Children (under 18 years of age)		X	
		Children under 5 years of age		X	
		Pregnant women		X	
		Participants studied with respect to contraception or conception		X	
	If YES please specify disability*.	People with disability (e.g. learning or communication difficulties)	X*		
	Note that you may also need to obtain satisfactory Disclosure Scotland (or equivalent) clearance.	People in custody		X	
		People engaged in illegal activities (e.g. drug-taking)		X	
		Non-human animals		X	
		Patients		X	
		More than 5000 participants		X	

Visual Impairment*

Please tick **either** Box A **or** Box B below and provide any details required in support of your application. If you ticked NO to any of Q1-9 or YES to any of Q10-12 then you must tick Box B.

A. I consider that this project has **no** significant ethical implications to be brought before the University Research Ethics Committee.	

State the purpose of the research. Give a brief description of participants and procedure (including the planned sample size and methods and tests used). This description must make clear what participants are expected to do. You must also make clear how data (e.g. video tapes) will be kept confidential and secure. Note that this description will be read by non-specialists and must be readily comprehensible by a lay person.

You must attach intended information and consent forms and copies of any questionnaires you plan to use.

B. I consider that this project may have ethical implications that should be brought before the Ethics Committee.	x

Please provide all the further information listed below in a separate attachment. Note that this description will be read by non-specialists and must be readily comprehensible by a lay person.

1. Title of project.
2. Purpose of project and its academic rationale.
3. Brief description of methods and measurements and how data will be stored.
4. Participants: recruitment methods, number, age, gender, exclusion/inclusion criteria.
5. Consent and participant information arrangements, debriefing.
6. A clear statement of the ethical considerations raised by the project and how you intend to deal with them.
7. Estimated start date and duration of project.

I am familiar with the University of Dundee *Code of Practice for Research on Human Participants*, and have discussed them with the other researchers involved in the project. I confirm that my research abides by these guidelines.

Signed ..... Print Name .....Date .....
(Lead Investigator)

There is an obligation on the lead researcher to bring to the attention of the Ethics Committee any issues with ethical implications not covered by the above checklist.

Lesley McIntyre
Dundee School of Architecture
University of Dundee

Ethical Approval Committee Expansion Report

1. Title of project.

Way-finding for People with Visual Impairment:
A 'design tool kit' for Architects [TBC]

2. Purpose of Project and its Academic Rationale.

Synopsis

This research will explore the real needs and problems a visually impaired person could encounter whilst finding their way independently through a public building. The Royal National Institute for Blind People1 has recognised that the built environment fails to instil confidence in the visually impaired in regard to way finding. This reinforces the need for a comprehensive architectural approach to designing way finding systems for those who have limited sight.

The research will adopt a qualitative multimodal approach to assist in validating creative and reflective practice. It will use tacit knowledge from experience of working with impairment charity user groups along with skills gained from the applicant's architectural training. A combination of grounded theory and ethnographic methodologies will be employed to explore issues in relation to visual impairment and way finding. This research will implement a framework of approaches from the post-positivistic paradigm rather than a positivistic paradigm as it will be; interested with generating theories rather than testing hypothesis; it will use small samples instead of larger samples and; the data generated will be rich and subjective to the visually impaired way-finding experience and will therefore produce qualitative data.

Proposed Research Outcome

Addressing pragmatics and non-visual aesthetics, this research will inform and improve the realisation of undemanding way finding systems that rely on a more considered holistic sensorial stimulus. Architects need to have awareness of appropriate considerations to address the needs a visually impaired person may face as they travel independently around a public building. The outcome will be the creation of best practice guidelines to enable architects, planners and procurers of buildings with strategies to craft appropriate circulation spaces. The 'best practice guidelines' will aim to improve the experience and ability of way finding in public buildings for people with limited sight. These guidelines will be disseminated through a publication to be available in areas of academic and professional design.

Testing

As identified from a vast literature study, a way-finding system is more than just signs; it encompasses architecture, landscape architecture, lighting, landmarks and orientation spaces. Its ultimate goal is to assist users with spatial problem-solving by providing constant clues (Arthur and Passini, 1992).

Previous to undertaking the way-finding scenario the visually impaired participants will be asked what format they would like to receive the Participant Information Sheet and Consent Form. (Braille, Audio CD, Large text format, email etc). These forms

[1] Baker M.RNIB May(1999)Rights of Way

will be transcribed into the desired format and sent to each person. This will enable all participants of different ranges of visually impairments to understand what being involved with the research will entail. It will give them a chance to ask the researcher further questions. In this information pack, the researcher will also begin to suggest days to carryout the way-finding scenario. The pack will also include directions & methods of transport in order to get to the meeting place on the chosen day.

The way-finding scenarios will take place in buildings located on the University of Dundee Campus. The participants recruited will individually visit and take part in the way-finding scenario. The participant will be given a starting location and a destination point within a public building that is deemed to fulfil DDA regulations and so be of an adequate and safe nature. The problems/difficulties caused by the way-finding system will be identified, travelled and analysed through methods such as; GPS personal tracking, verbal descriptions, videos and an informal discussion.

On meeting the participant the researcher will ask that the consent form is signed (a visual impairment signature guide will be available if needed) and will brief the participant (based on the Participant Information Sheet). The participant will be given and shown how to use the recording device. (Permission to use this data will be asked for in the consent form). The researcher will ask if the participant has any questions and will state that participation may stopped and withdrawn at any time throughout the study without explanation and that the data that is provided may also be withdrawn if desired.

The researcher will then take the participant to the starting location and state the destination point. The way-finding scenario will begin.

The participant will be asked to travel and find their way to arrive at the destination where the researcher will meet them and answer any questions they might have. At this point the researcher will provide refreshments, debrief the participant and there will be a further informal discussion based on their experience.

3. Brief description of methods and measurements and how data will be stored.

Interpretive-based multi-method investigation will form a major part of the research and will provide data relating to collection of experiences, thoughts, forms and extents of contextual interaction. (Wisker, 2007) It is proposed that a series of scenarios will be devised to build a body of data which then will be used to inform design considerations and guidelines.

Data from these scenarios will take the form of; GPS Tracking, narrative, description, audio recordings, video recording and analysis. The tracking system will be used to map the journey the participant takes when travelling through the sequence of spaces. This tracking, coupled with the more experiential methods will ultimately highlight the positives and negatives of the independent, visually impaired way-finding experience.

The GPS will create ‘live maps’ that can be comparatively analysed (e.g. mapped on top of each other to highlight difference in way-finding technique/time spent at particular problematical areas of the building. It is thought that a lot of data will be produced from these ‘live maps’. This data will be safely and appropriately stored

electronically on the researcher's personal and secure personal computer and hard-drive back-up system.

Interviews and de-briefing at the end of the way-finding scenario will be recorded by the Dictaphone and then analysed as a document. These 'experiences' will be interpreted by qualitative analysis research programs such as coding programs such as ATLAS or NVivo 8 Program .

Storage of Data

While the information and recordings will be used, they will be kept in a locked place in the School of Architecture, University of Dundee. Only the researcher will have access to them. These items will be kept safely for up to 5 years and then destroyed.

4. **Participants: recruitment methods, number, age, gender, exclusion/inclusion criteria.**

Cross-discipline activity
Recruitment methods Working in a cross-disciplinary way has provided opportunity to draw on expertise and experience in working with people with a range of impairments from established research institutes. These include; the Interdisciplinary Disability Research Institute within the School of Education, (who attempt to bring together researchers with an interest in age, disability and social issues from multiple disciplines); the School of Computing (who have been developing information technology systems for people with impairment for over 25 years) and; Disability Services out-with the University setting. Meeting and working closely with these institutes as well as charities such as RNIB and Sense Scotland has enabled me to meet with a range of visually impaired people who are potential participants.

Number- Approximately 20 participants will be involved to be part of the study. This number will depend on the amount and type of data that is produced. It might be relevant that only 10 participants will be used until data saturation point is reached. This will become apparent as the proposed research experiments evolve and are completed.

Age – 18+ deemed adults

Gender – Male and Female

Exclusion/inclusion criteria – it will be key to the research that people with a range of visual impairments will take part in the way-finding scenarios.

Debriefing will take place in the PhD base on the conclusion of each way-finding scenario. This will give the researcher the chance to reiterate the main factors about the investigation; state that participation is voluntary and the visitor can withdraw their information/data without any penalty and for any reason at anytime. The debriefing session will include an informal discussion which will further gather information about the way-finding difficulties and needs.

Lesley McIntyre
Dundee School of Architecture
University of Dundee

5. **A clear statement of the ethical considerations raised by the project and how you intend to deal with them.**

   The project will not be misleading in anyway and measures will be taken to ensure that the visitor is safe when taking part in the way-finding scenario. It is not thought that the participant will experience physical or psychological distress or discomfort. There may be a risk of the Participants becoming completely lost and upset as they travel through the environment. In order to combat this, the visitor will be given a pager to be pressed when help is needed. The researcher will be on site and will be able to locate the participant by using a GPS Personal Tracker & Alarm device.

   Permission will be asked to use the verbally recorded/visually recorded data that is supplied throughout the way-finding scenario. Relevant measures will be taken to ensure that the participants and others identities are protected. The participant will be told that they may stop being part of the research study at any time without expectation.

   If the agreed time spent on the way-finding scenario takes longer than originally thought, the participant will be approached and given the choice of whether or not to keep going or to stop. I f they decide to stop, they will then be taken, debriefed and offered refreshments.

6. **Estimated start date and duration of project.**
   Estimated start date February 2008, It is thought that way-finding scenario data will be gathered from February-March and the estimated PhD conclusion date is December 2011.

PARTICIPANT INFORMATION SHEET

WAY-FINDING FOR PEOPLE WITH VISUAL IMPAIRMENT: A 'DESIGN TOOL KIT' FOR ARCHITECTS.

INVITATION TO TAKE PART IN A RESEARCH STUDY

This research will explore the real needs and problems a visually impaired person could encounter whilst finding their way independently through a public building.

The researcher is Miss Lesley McIntyre from the School of Architecture, University of Dundee, she is being supervised by; Professor Simon Unwin, Jeanette Paul and; Professor Jennifer Harris, University of Dundee.

PURPOSE OF THE RESEARCH STUDY

This study will involve you undertaking a way-finding task within a public building (that is deemed to be accessible and fulfil DDA regulations and so be of an adequate and safe nature), on the University of Dundee campus. You will be given a starting location and a destination point within a public building and be asked to find your way (as you normally would when visiting a building) between these two points.

The researcher will meet you at the destination point and will answer any questions you might have. You will then be offered refreshments in the researcher's office and further discussion can take place.

Recording the Information

When undertaking the way-finding scenario you will be asked to verbally (and possibly) visually record the positives and negatives of your experience of finding your way through the building. This will either involve speaking in to a Dictaphone or holding and speaking into a video camera. Your movements from the starting point to the destination point will be mapped by the GPS. **You can say at any time that you do not want to give your views or for them to be recorded. You can withdraw from the study at anytime.**

The researcher will meet you in a suitable place prior to carrying out the way-finding scenario to show you how to use the voice recording device. You are being asked to tape record your views (audio and/or video) so that the researcher can hear your views again. The results from these scenarios will be compiled by the researcher into a report (under supervision). You will also be given and be shown how to use a pager that will also have a GPS which will map your movement. This will enable your movements to be mapped and it will enable you to be found in case of an emergency or if you suffer any distress/discomfort and want the researcher to come to you.

WHO BENEFITS FROM THE RESEARCH

Your views will increase understanding of the difficulties and needs a visually impaired person encounters when way-finding independently around public buildings. It will develop a new knowledge base for architects and designers of buildings and will influence future design of circulation in public buildings.

TIME COMMITMENT

The study will require a visit to the University of Dundee Campus Buildings and will include an informal discussion at the end of the way-finding task. The visit will last for approximately 60 minutes and the interview will last for approximately 20 minutes. Total estimated completion time will be 80 minutes. If this time is exceeded you will be approached and given the option to end the task or to continue if you wish. If you

decide that you do not wish to continue with the task; this is not a problem; you will not be asked to explain why you have taken this decision.

TERMINATION OF PARTICIPATION

You may decide to stop being a part of the research study at any time without explanation.
Your contribution is voluntary and you will receive refreshments at the end of the visit/discussion.

RISKS

There are no known risks for you in this study.

COST, REIMBURSEMENT AND COMPENSATION

Your participation in this study is completely voluntary.

CONFIDENTIALITY/ANONYMITY

It is guaranteed that the data collected will not contain any personal information about you.
No one will link the data you provided to your identity and name.

It is guaranteed that if video recording is used, your face and voice will be omitted from any resulting film clips.

The results will be published in a report to academic journals, seminars and finally in a PhD Thesis at the end of the researchers study. I guarantee to not use any material that identifies you.

STORAGE OF PERSONAL INFORMATION

While the information and recordings will be used, they will be kept in a secure and locked place in the School of Architecture, University of Dundee. Only the researcher will have access to them. These items will be kept safely for up to 5 years and then destroyed.

FOR FURTHER INFORMATION ABOUT THIS RESEARCH STUDY

Lesley McIntyre will be glad to answer your questions about this study at any time and if you want to find out about the final results of this study please find the contact information below.

Contact Information; lesleymcintyre@hotmail.co.uk or ljmcintyre@dundee.ac.uk

Address;

Dundee School of Architecture

Matthew Building (Level 7)

University of Dundee
13,Perth Road
Dundee

The University Research Ethics Committee of the University of Dundee has reviewed and approved this research study.

INFORMED CONSENT FORM

TITLE OF PROJECT

Way-finding for People with Visual Impairment:
A 'Design Tool Kit' for Architects.

The intention of this research is to explore the real needs and problems a visually impaired person could encounter whilst finding their way independently through a complex public building.

You are being asked to take part in an architectural research study which will highlight your experiences (as a visually impaired person), of independently finding your way around a public building.

You will be asked to verbally record the positives and negatives of your experience of finding your way through the building. **You can say at any time that you do not want to give your views or for them to be recorded.**

Your views will increase understanding of the difficulties and needs a visually impaired person encounters when way-finding independently around public buildings. It will develop a new knowledge base for architects and designers of buildings and will influence future design of circulation in public buildings.

By signing below you are agreeing that you have read and understood the Participant Information Sheet and that you agree to take part in this research study.

_____ _____

Participant's signature Date

_____ _____

Printed name of person obtaining consent Signature of person obtaining consent

NOTE: The Consent Form should normally be separate from the Participant Information Sheet so that the participant has something they can keep.

Contents

Disability Services and Talking Newspapers Ad - Title: **Please help me to 'Find my Way'!!!!**

I am a PhD Architectural Student carrying out Way-finding Scenarios around campus buildings. I would like people with visual impairment and blindness to be the focus of the study. Males/females of all ages required.

A little bit of information about the way-finding scenarios.

Previous to taking part in a way-finding task we will have a short informal chat.

If you still want to be involved in the research you will be asked to find your way between a starting location and a destination point in a building located on the University of Dundee Campus. You will be asked to keep a record of any problems/difficulties experienced when finding your way between these two points through walking with a recording device.

Afterwards, we will have another informal chat over coffee/tea/juice and tasty cakes.

If you or someone you know wants to become involved please email me: l.j.mcintyre@dundee.ac.uk

University of Dundee Hermes Ad - Title: Non-Visual Way-finding.

I am a PhD Architectural Student who is carrying out Way-finding Scenarios around college campus and other public buildings. I am especially interested in volunteers with visually impaired, but keen to work with those who are sighted as well. Males/females of all ages required. Rewards will include Tea/Coffee & Cakes over a debriefing chat.

If you are interested in becoming involved or if you know someone who might be interested please get in contact; l.j.mcintyre@dundee.ac.uk

Contents

Contents

01: University of Dundee Research Ethics Approval Form

02: Advertisements [Examples: Hermes UOD, Disability Services and Talking Newspapers]

03: Ethics Approval Letter

04: Changes Made as Study Progressed

05: Updated Ethics Approval Letter

PARTICIPANT INFORMATION SHEET

WAY-FINDING FOR PEOPLE WITH VISUAL IMPAIRMENT:
A 'DESIGN TOOL KIT' FOR ARCHITECTS.

INVITATION TO TAKE PART IN A RESEARCH STUDY

PURPOSE OF THE RESEARCH STUDY
This research will explore the real needs and problems a visually impaired person could encounter whilst finding their way independently through a public building. The researcher is Miss Lesley McIntyre from the School of Architecture, University of Dundee, she is being supervised by; Graeme Hutton, Jeanette Paul and; Professor Jennifer Harris, University of Dundee.

You are being asked to take part in this study as a professional in the field of this study. You will be taking part in an informal chat with the researcher to talk about your experiences of teaching/training people with visual impairment to be able to orientation and navigate through buildings.

The conversation will take the form of general discussion. Questions prompted from the discussion may also be asked by the researcher.

Recording the Information

The conversation will be recorded using a Dictaphone so that the researcher can hear your views/comments and experience again. This information will be compiled by the researcher into a report (under supervision).

You can say at any time that you do not want to give your views or for them to be recorded. You can withdraw from the study if and when you do not want to be part of it any more.

WHO BENEFITS FROM THE RESEARCH

Your views will increase understanding of the difficulties and needs a visually impaired person encounters when way-finding, orientating and navigating independently around public buildings. It will develop a new knowledge base for architects and designers of buildings and will influence future design of circulation in public buildings. The main aim of the research will be to provide architects with design strategies based on your opinions that will enable them to design buildings that will allow people with visual impairment to find their way with safety and ease.

TIME COMMITMENT

The conversation will take approximately 60 minutes

TERMINATION OF PARTICIPATION

You may decide to stop being a part of the research study at any time without explanation.

Your contribution is voluntary and you will receive refreshments at the end of the visit/discussion.

RISKS

There are no known risks for you in this study.

COST, REIMBURSEMENT AND COMPENSATION

Your participation in this study is completely voluntary.

CONFIDENTIALITY/ANONYMITY

It is guaranteed that the data collected will not contain any personal information about you.

No one will link the data you provided to your identity and name.

The results will be published in a report to academic journals, seminars and finally in a PhD Thesis at the end of the researchers study.

I guarantee to not use any material that identifies you.

STORAGE OF PERSONAL INFORMATION

While the information and recordings will be used, they will be kept in a secure and locked place in the School of Architecture, University of Dundee.

Only the researcher will have access to them. These items will be kept safely for up to 5 years and then destroyed.

FOR FURTHER INFORMATION ABOUT THIS RESEARCH STUDY

Lesley McIntyre will be glad to answer your questions about this study at any time and if you want to find out about the final results of this study please find the contact information below.

Contact Information; lesleymcintyre@hotmail.co.uk or

ljmcintyre@dundee.ac.uk

Address;

Dundee School of Architecture

Matthew Building (Level 7)

University of Dundee

13,Perth Road
Dundee
The University Research Ethics Committee of the University of Dundee has reviewed and approved this research study.

INFORMED CONSENT FORM

TITLE OF PROJECT

Way-finding for People with Visual Impairment:
A 'Design Tool Kit' for Architects.

The intention of this research is to explore the real needs and problems a visually impaired person could encounter whilst finding their way independently through a complex public building.

You are being asked to take part in an architectural research study which will highlight your experiences of training people with visual impairment/blindness to be able to independently move, orientate and navigate themselves through a public building.

You will be asked to have an informal conversation with the researcher. Some questions may be asked.

You can say at any time that you do not want to give your views or for them to be recorded.

By signing below you are agreeing that you have read and understood the Participant Information Sheet and that you agree to take part in this research study.

Participant's signature

Date

Printed name of person obtaining consent

Signature of person obtaining consent

01: University of Dundee Research Ethics Approval Form

02: Advertisements [Examples: Hermes UOD, Disability Services and Talking Newspapers]

03: Ethics Approval Letter

04: Changes Made as Study Progressed

05: Updated Ethics Approval Letter

Appendix E

Data Registration

Data Protection

UNIVERSITY OF DUNDEE

DATA PROTECTION ACT 1998

APPLICATION FOR THE INCLUSION OF A RESEARCH PROJECT ON THE UNIVERSITY OF DUNDEE DATA PROTECTION REGISTRATION

DEPARTMENT/SECTION: [Dept/Section name] Dundee School of Architecture

CONTACT NAME: [Name] Lesley McIntyre

EMAIL: [email address of contact]
l.j.mcintyre@dundee.ac.uk OR lesleymcintyre@hotmail.co.uk
ADDRESS: [Departmental Address]
Dundee School of Architecture, Duncan of Jordanstone 113 Perth Road
TELEPHONE/FAX: [phone/fax number]
07738283513

NAME OF PRINCIPAL RESEARCHER: [Name] Lesley Jayne McIntyre

NAME OF DATA COLLECTOR AND USER: [Name] Lesley Jayne McIntyre

TITLE OF RESEARCH PROJECT: [Full formal title of project] Non-Visual Way-finding Way-finding in buildings by people with a visual impairment: understanding issues that affect how people with a range of visual impairments find their way in buildings; and guidance on how these might be addressed through a series of design considerations.

ARE YOU (please tick all relevant boxes)**:**
Applying to the UoD Ethics Committee for Ethics Permission?
Yes No

How will the Data be stored?
Electronic Database
Paper files
Both of these storage methods will be used

Do you have security checks in place for access to the Data?
Yes No

Have you registered your electronic database with your Department's computer representative?
Yes No

Have you informed your Department's Data Protection Coordinator about your project/filing system?
Yes No

How long will your project last? [length of project] Dec 2007 - Dec 2010

Will you be obtaining signed consent from your Data Subjects?
Yes No

If Yes please attach a copy of your subject information sheet and your consent form.
Please see attached. Ethical Approval Applied for – 17th December 2008
•Granted -25th February 2009
If No please give details of the reason for not obtaining consent:
[Reasons for not obtaining consent]

THE FOLLOWING ARE THE STANDARD PURPOSES FOR THE USE, AND DESCRIPTIONS OF THE TYPE, OF PERSONAL DATA INCLUDED IN THE UNIVERSITY'S CURRENT NOTIFICATION WITH THE INFORMATION COMMISSIONER. IF YOUR RESEARCH IS NOT COVERED BY THESE YOU MUST ADD NEW INFORMATION AT THE END.

PERSONAL DATA WILL BE HELD FOR THE FOLLOWING PURPOSE:

Staff, Agent and Contractor Administration
Advertising, Marketing, Public Relations, General Advice Service
Accounts and Records
Education
Student and Staff Support Services
Research
Other Commercial Services
Publication of the University Magazine
Crime Prevention and the Prosecution of Offenders
Alumni Relations
Health Administration and Services
Information and Databank Administration
Other [specify]

If you are unsure of the definition of any of the above contact the University's Data Protection Officer for clarification before proceeding

PERSONAL DATA WILL BE COLLECTED FROM THE FOLLOWING DATA SUBJECTS (please tick all relevant boxes)**:**

Survey respondents, other persons assisting research
Patients
Patients' families
Employees, trainees, voluntary workers
Employees of associated companies, organisations
Employees of other organisations
Recipients, customers or clients for goods or services (direct or indirect)
Suppliers of goods or services (direct or indirect)
Claimants, beneficiaries, payees
Account holders
Share and stock holders
Partners, directors, other senior officers
Employers
Competitors
Business or other contacts
Advisors, consultants, professional and other experts ✓
Agents, other intermediaries
Trustees
Members, supporters of club, society, institution ✓
Assignees, guarantors, other parties with a legitimate contractual or business interest
Donors and lenders
Complainants
Witnesses
Offenders and suspected offenders
Tenants
Landlords, owners of property
Correspondents and enquirers
Self employed persons ✓
Unemployed persons ✓
Retired persons ✓

Students
Minors
Applicants for permits, licences, registration
Taxpayers, ratepayers
License holders
Vehicle keepers
Elected representatives, other holders of public office
Authors, publishers, editors, artists, other creators
Immigrants, foreign nationals
Relatives, dependants, friends, neighbours, referees, contacts, associates of any of those ticked above
Other: [specify]

DESCRIPTION OF PERSONAL DATA TO BE COLLECTED (please tick all that apply)**:**

Identification data
Personal identifiers
Financial identifiers
Identifiers issued by public bodies

Personal characteristics
Personal details
Physical description
Habits
Personality, character

Family circumstances
Current marriage or partnership
Marital history
Details of other family, household members
Other social contacts

Social circumstances
Accommodation or housing
Property, professions
Immigration status
Travel, movement details
Leisure activities, interests
Lifestyle
Membership of voluntary, charitable bodies
Public offices held
Licenses, permits held
Complaint, incident, accident details
Court, tribunal, inquiry proceedings

Education, Skills, Profession
Academic record
Qualifications and skills
Membership of professional bodies
Professional expertise
Membership of committees
Publications
Student record

Employment details
Current employment
Recruitment details

Termination details
Career history
Work record
Health and Safety record
Trade union, staff association membership
Payment, deductions
Property held by employee
Work management details
Work assessment details
Training record
Security details

Financial details
Income, assess, investments
Liabilities, outgoings
Creditworthiness
Loans, mortgages, credits
Allowances, benefits, grants
Insurance details
Pension details

Details of transactions
Goods, services provided to the data subject
Goods, services obtained from the data subject
Financial transactions
Compensation

Business information
Business activities of the data subject
Agreements, contracts
Trading licenses held

Health and other classes
Physical health record
Mental health record
Disabilities, infirmities 
Dietary, other special health requirements
Sexual life
Racial, ethnic origin
Motoring convictions
Other convictions
Criminal intelligence
Political opinions
Political party membership
Support for pressure groups
Religious beliefs
Other beliefs

Miscellaneous information
References to manual files, records
Uncategorised information

Other data class: [specify]

THE DATA AND/OR THE RESULTS OF THE RESEARCH WILL BE DISCLOSED TO:

Individuals or organisations directly associated with the Data Subjects
The data subjects themselves ✓
Family, relatives, guardians, trustees
Other members of the household, friends, neighbours
Employers – past, current or prospective
Employees, agents
Colleagues, business associates
Legal representatives
Financial representatives
Doctors, Dentists, other advisors
Social, spiritual, welfare, advice workers
Other professional advisors
Landlords

Individuals or organisations directly associated with the Data User
Research sponsors
Funding agencies
Ethics committees
Members, including shareholders
Other companies in the same group
Employees, agents
Recipients, customers, clients, for goods or services
Claimants, beneficiaries, assignees, payees
Suppliers, providers of goods or services
Persons making an enquiry or complaint
Tenants
Other [specify]

Organisations or individuals (general description)
Central Government
Inland revenue
Customs and excise
Driver and Vehicle Licensing Agency (DVLA)
Department for Education and Skills (DfES)
Department of Health
Department of Work and Pensions
Ministry of Defence
Home Office
Department of Constitutional Affairs
Other [specify]

Devolved Administration
Development Department
Education Department
Enterprise, Transport and Lifelong Learning Department
Environment and Rural Affairs Department
Financial and Central Services Department (FCSD)
Health Department
Justice Department
Legal and Parliamentary Services
Other [specify]

Local Government
Education departments
Housing departments
Social Services departments
Electoral registration, assessment
Valuation departments

Other [specify]

Other Public Bodies
Other public bodies not specified elsewhere [specify]
Foreign governments and authorities [specify]

Justice
Police forces
Prosecuting authorities
Other statutory law enforcement agencies [specify]
Investigating bodies
The courts
Judges, magistrates
Prison service
Probation service

Health and social welfare
Health authorities, family practitioner committees, or Family Health Service Authorities
Hospitals, nursing homes
Registered medical practitioners
Registered dental practitioners
Nurses, midwives, health visitors
Other care agencies, practitioners [specify]
Social welfare agencies, practitioners [specify]

Other
Public utilities
Banks
Building societies
Insurance companies
Other financial organisations [specify]
Accountants & auditors
Lawyers
Credit reference agencies
Debt collection, tracing agencies
Employment, recruitment agencies
Private detective agencies, security organisations
Trade, employers associations
Trade unions, staff associations
Professional bodies
Voluntary, charitable, religious organisations or associations
Political organisations
Education or training establishments, examining bodies
Survey or research organisations, workers
Providers of publicly available information, including public libraries, press and media
Providers of privately available information and databanks
Traders in personal data
Other organisation or individual [specify]

PUBLICATION
Will any information from this research/filing system be published in any format?
Yes ✓ No

Please note: All published information must be anonymised so that it does not contain any data from which a living individual can be identified, unless explicit written consent has been obtained to do so.

OVERSEAS TRANSFER

The Eighth Data Protection Principle
Personal data shall not be transferred to a country or territory outside the European Economic Area unless that country or territory ensures an adequate level of protection for the rights and freedoms of data subjects in relation to the processing of personal data.

The European Economic Area consists of the member states of the European Union together with Iceland, Liechtenstein and Norway. Data may be transferred within the European Economic Area without restrictions.

If you are collecting data in a country outside the European Economic Area please attach details of the Data Protection provision in that country or territory.

If you intend to transfer Data to any other country or territory please give details below and attach a copy of your agreement regarding personal data with the recipient of said data.

[Details of agreement]

I, the undersigned, understand my obligations in dealing with personal data and agree to abide by the principles detailed in the Data Protection Act 1998.

Signed_____

Print Name_____

Date_____

Please send the completed form to

University Data Protection Officer,
c/o Archive, Records Management and Museum Services
Tower Building
University of Dundee
Dundee DD1 4HN

A reference for this form which may be quoted on the Ethics application and other relevant forms will be sent to you.

Appendix F Dissemination

(McIntyre, 2009;McIntyre, 2010c;McIntyre, 2010b;McIntyre, 2010a;McIntyre, 2011b;McIntyre, 2011a;McIntyre et al., 2009;McIntyre et al., 2010c;McIntyre et al., 2010d;McIntyre et al., 2010a;McIntyre et al., 2010b;McIntyre et al., 2011)

	Location	Date	Reference	Details
01: Scottish Federation of University Woman Research Presentation Day	University of Abertay, Dundee	*25th April 2009.*	**MCINTYRE, L., HARRIS, J. & PAUL, J. (2009) Non-Visual Way-finding. *Scottish Federation of University Women Dundee Association.* [Presented 25th April 2009] Dundee.**	A research abstract was submitted and I was one of nine female researchers selected to present at the Scottish Federation of University Woman Research Presentation Day.
02: 2009/2010 Graduate Junction Competition	http://www.graduatejunction.net/posters/archive	*2009/2010*	**MCINTYRE, L. (2010c) *Poster: Non-Visual Way-finding* [online] http://www.graduatejunction.net/posters/archive**	I was one of 300 entries to be shortlisted under the category of Arts and Humanities. [Other categories included Social Sciences and Physical and Medical Science]. Outcome: I was awarded first place within the Arts and Humanities Category and placed Second within the overall competition.
03: The Future of Global Disability Research	University College London: Centre for International Health and Development	*11th October 2010*	**MCINTYRE, L. (2010b) Poster: 'Let me show you how I get from A-to-B……' // Way-finding Signs Unseen. *The Future of Global Disability Research.* [Presented 11th October 2010] London, University College London: Centre for International Health and Development**	Poster Presentation
04: Lancaster Disabilities Conference	Lancaster University	*7-9 September 2010*	**MCINTYRE, L., HARRIS, J. & PAUL, J. (2010a) Let me show you how I get from A to B: Non-Visual Way-finding Hot-spots in Buildings: A Methodological Approach. *Lancaster Disabilities Conference.* [Presented 8th September 2010] Lancaster.**	Presentation

	Location	Date	Reference	Details
05: Knowledge Transfer Scotland: Policy and Practice Conference. Impact Poster Competition 2010	**Herriot Watt University Edinburgh**	*April 2010*	**MCINTYRE, L., HARRIS, J. & PAUL, J. (2010b) Poster: Non-Visual Way-finding. *Knowledge Transfer Scotland: Impact Poster Competition.* [Presented April 2010] Edinburgh, Heriot-Watt University.**	Run in association with the KT Scotland Conference, early-stage researchers (PhD students and Postdoctoral Fellows) were encouraged to consider what could be the potential impact of their research on wider society by preparing a poster for display at the conference. The top 20 posters of all the proposals submitted were selected to be displayed at the conference. My Impact Poster was selected to be displayed at the KT Scotland Conference within the HEALTH category. Poster Abstract accepted and shortlisted (300 -20) in the Competition
06 Aiming for Accessibility: Meeting Standards Making Change Conference	**University of Guelph, Toronto Canada.**	*June 8th-9th 2010*	**MCINTYRE, L., HARRIS, J. & PAUL, J. (2010c) Signs Unseen: Seeking a Way Out of the Visual Way-finding Maze. *Aiming for Accessibility Meeting Standards, Making Change Conference.* [Presented June 8th] Canada, University of Guelph.**	Presentation via Skype
07Access by Design Journal		*March 2010*	**MCINTYRE, L., HARRIS, J. & PAUL, J. (2010d) Signs unseen: seeking ways out of the visual way-finding maze. *Access by Design,* 122, 20-23**	Article published in 'Access by Design Journal' Centre for Accessible Environments (March 2010 Edition) (Editor Madeleine Gray)
08 Design for Health Conference Sheffield	**Sheffield Hallam University**	*13 – 15 July 2011*	**MCINTYRE, L., HARRIS, J. & PAUL, J. (2011) 'Let me show you what happens as I get from A-to-B': Way-finding Design, Visual Ability & 'Way-finding Hot-spots'. *Design for Health Conference* [Presented 13th July 2011] Sheffield**	Presentation

PhD Research Seminars Dundee School of Architecture and Geddes Institute for Urban Research

http://www.dundee.ac.uk/geddesinstitute/phdseminars.htm

MCINTYRE, L. (2009) 'Finding my Way' through this Research. *Geddes Institute for Urban Research. PhD Doctoral Research Seminars.* Dundee, University of Dundee.

MCINTYRE, L. (2010a) Non-Visual Way-finding: Architectural Hot-spots. *Geddes Institute for Urban Research. PhD Doctoral Research Seminars.* Dundee, University of Dundee.

MCINTYRE, L. (2010b) Poster: 'Let me show you how I get from A-to-B……' // Way-finding Signs Unseen. *The Future of Global Disability Research.* London, University College London: Centre for International Health and Development

MCINTYRE, L. (2010c) *Poster: Non-Visual Way-finding* [online] Accessed http://www.graduatejunction.net/posters/archive

MCINTYRE, L. (2011a) Accessibility Workshop. Dundee, University of Dundee.

MCINTYRE, L. (2011b) An Exploration of 'Way-finding Hot-spots'. *Geddes Institute for Urban Research. PhD Doctoral Research Seminars.* Dundee, University of Dundee.

MCINTYRE, L., HARRIS, J. & PAUL, J. (2009) Non-Visual Way-finding. *Scottish Federation of University Women Dundee Association.* Dundee.

MCINTYRE, L., HARRIS, J. & PAUL, J. (2010a) Let me show you how I get from A to B: Non-Visual Way-finding Hot-spots in Buildings: A Methodological Approach. *Lancaster Disabilities Conference.* Lancaster.

MCINTYRE, L., HARRIS, J. & PAUL, J. (2010b) Poster: Non-Visual Way-finding. *Knowledge Transfer Scotland: Impact Poster Competition.* Edinburgh, Heriot-Watt University.

MCINTYRE, L., HARRIS, J. & PAUL, J. (2010c) Signs Unseen: Seeking a Way Out of the Visual Way-finding Maze. *Aiming for Accessibility Meeting Standards, Making Change Conference.* Canada, University of Guelph.

MCINTYRE, L., HARRIS, J. & PAUL, J. (2010d) Signs unseen: seeking ways out of the visual way-finding maze. *Access by Design,* 122, 20-23

MCINTYRE, L., HARRIS, J. & PAUL, J. (2011) 'Let me show you what happens as I get from A-to-B': Way-finding Design, Visual Ability & 'Way-finding Hot-spots'. *Design for Health Conference* Sheffield

Accessibility Workshop with 4th Year Architects

MCINTYRE, L. (2011a) *Accessibility Workshop,* Dundee, University of Dundee [Unpublished Work]

Appendix G
Training Audit

Course Provider	Course/Workshop/Conference Details	Date
Dundee Partially Sighted Society	Visual Impairment Mobility Training Workshop	June 2007
Conference [Attended]	In Touch with Art an International Conference on Art, Museums and Visual Impairment V&A, LondonSt Dunstan's, V&A, Goldsmiths, University of London	28th/29th November 2007
Conference [Attended]	Sensory Urbanism Conference University of Strathclyde	8th/9th Jan 2008
The North East Scotland Research Training Network	Post-Graduate Training Week- DCA	28th/29th/31st January 1stFeb 2008
Generic Skills	Scholarly Writing - Where are you now ?(1st Year)	05/05/2008
Generic Skills	How to Manage your PhD Project	27/11/2008
Generic Skills	Project Management for PhD Students (Art/Arts and Social Sciences)	27/11/2008
IDRIS	User Innovation Day with the Interdisciplinary Disability Research Institute.	01/12/2008
DCA	Video Editing Course	15/02/ 2009
Generic Skills	Word for Thesis Writing- Advanced Word Functions	25/02/ 2009
Lighthouse Glasgow	Pascale Lecoq, architect and director of the Laboratory of Movement Study (L.E.M) at the International Theatre School Jacques Lecoq in Paris, visited Glasgow to lead an introduction to L.E.M. techniques.	07/03/2009
Generic Skills	Insights Profiling - Understanding You	17/03/2009

Generic Skills	Map Your Mind: Creative Note-making for Research	24/03/2009
Generic Skills	Writing/Giving Conference Papers - Part 1	28/04/2009
Generic Skills	Scholarly Writing	05/05/ 2009
Generic Skills	Endnote Workshop	11/05/ 2009
Generic Skills	'Map your Mind' Creative Note-making for Research	04/06/ 2009
The North East Scotland Research Training Network	Summer School DCA PhD Researchers	17th/18th/19th/20th August 2009
Generic Skills	'Read at Speed'	29/10/2009
Generic Skills	Excel Functions, Tricks and Shortcuts Part I	09/11/2009
The North East Scotland Research Training Network [nesres]	Research Training 2009 Writing for Creative Disciplines Workshop	03/12/ 2009
Generic Skills	Winning Research Funding	04/02/2010
l'DGO and Edinburgh College of Art	A Built Environment for all ages	19/03/2010
Dundee College	Introduction to British Sign Language Pre-Stage Sign Language Course	08/09/2010
Generic Skills	Introduction to Teaching and Supporting Learning Part I	04/10/2010
Generic Skills	Realise the True Value of Your PhD - First Steps in Career Development (Arts and Arts & Social Sciences)	31/05/2011